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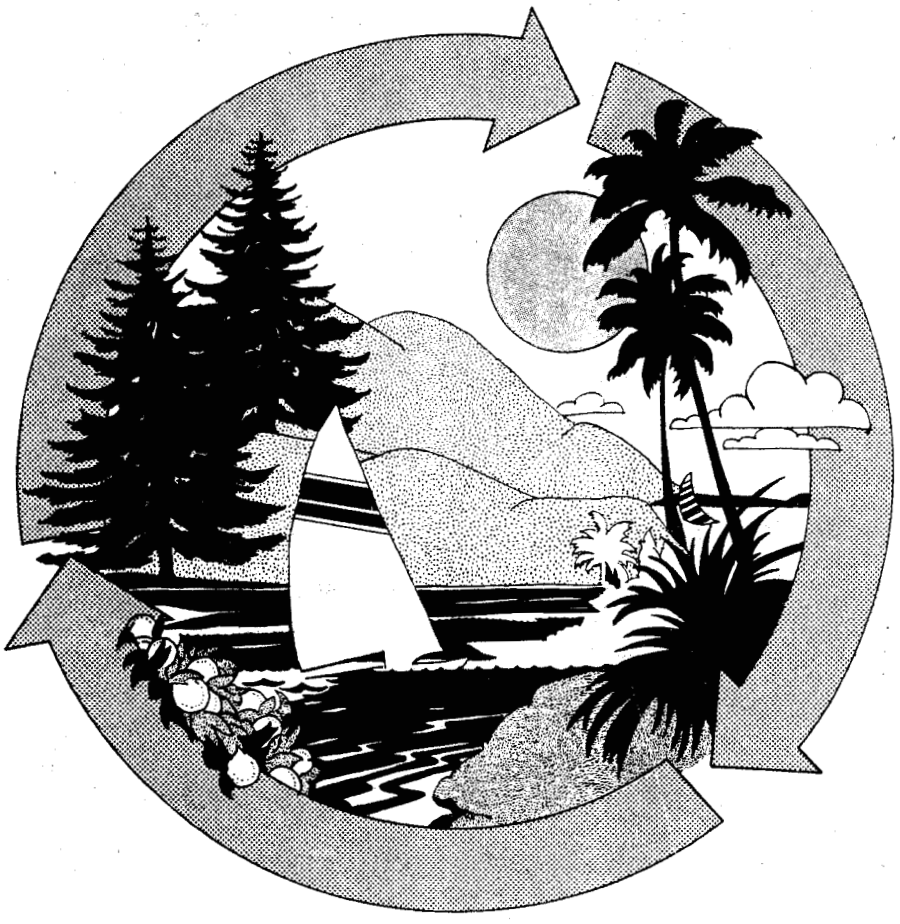
NATIONAL ROUNDTABLE OF STATE POLLUTION PREVENTION PROGRAMS

CONFERENCE PROCEEDINGS



1993 Spring Conference
"Connections for Pollution Prevention"

APRIL 28-30, 1993

Co-Sponsored by the:

- **United States Environmental Protection Agency - OSW, OPP, and Region IX**
- **California State Department of Toxic Substances Control**
- **American Petroleum Institute**
- **San Diego County Department of Health Services**

Host City: San Diego!

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TABLE OF CONTENTS

The Session Summaries appear in the order in which they were presented. Please review the Conference Agenda, which follows, for the date and time of the session.

	PAGES
Wednesday, April 28.....	1 - 62
Includes:	
Keynote Address	
- David Kling and Eric Schaeffer	
Plenary Session	
- "Connecting to the Needs of Industry"	
Break Out Session Summaries	
Keynote Address	
- John Wise	
Thursday, April 29.....	63 - 133
Includes:	
Plenary Session	
- "Connections for Enhanced Coordination"	
Break Out Sessions Summaries	
Friday, April 30.....	134 - 150
Includes:	
Break Out Session Summaries	
Appendix - List of Attendees	

Note: In many cases, only <u>partial</u> sets of overheads were included in this document due to printing constraints. Please contact the speakers for complete sets.

National Roundtable of State Pollution Prevention Programs
Spring 1993 Conference
"Connections for Pollution Prevention"
San Diego, California

WEDNESDAY, APRIL 28

REGISTRATION 7:00 A.M. - 1:00 P.M.

OPENING REMARKS 8:45 - 9:30 A.M.

"WELCOME! FROM THE ROUNDTABLE BOARD, THE STATE OF CALIFORNIA, AND SAN DIEGO"
PRESENTATION OF THE CONFERENCE OBJECTIVES, LOGISTICS, AND PERTINENT UPDATES.

KEYNOTE ADDRESS 9:30 - 10:15 A.M.

"POLLUTION PREVENTION- DIRECTIONS FOR THE FUTURE"
SPEAKERS: DAVID KLING, ACTING DIRECTOR, POLLUTION PREVENTION DIVISION, EPA
ERIC SCHAEFFER, DIRECTOR, POLLUTION PREVENTION POLICY STAFF, EPA
PRESENTATION OF THE FIVE THEMES THAT CHARACTERIZE AND GUIDE EPA'S CURRENT AND FUTURE POLLUTION PREVENTION EFFORTS.

BREAK 10:15 - 10:45 A.M.

PLENARY SESSION 10:45 A.M. - 12:00 P.M.

"CONNECTING TO THE NEEDS OF OUR CUSTOMERS"
SPEAKERS: BARBARA BUSH, AMERICAN PETROLEUM INSTITUTE
JOE LUCAS, INLAND TECHNOLOGY
ROBERT FERRONE, DIGITAL
MODERATORS: DAVID HARTLEY, LINDA PRATT
PERSPECTIVES FROM VARIOUS SECTORS OF THE BUSINESS COMMUNITY ON THE DRIVING FORCES BEHIND SUCCESSFUL POLLUTION PREVENTION ACTIVITIES, AND RECOMMENDATIONS FOR ENHANCED COORDINATION WITH GOVERNMENT AGENCIES.

LUNCH NOON - 1:00 P.M. GARDEN TERRACE
LUNCHEON SPEAKER: MANIK ROY, ENVIRONMENTAL DEFENSE FUND

Break Out Sessions 1:30 - 3:00 P.M.

UNDERSTANDING THE NEEDS OF INDUSTRY
DAVID HARTLEY, CALIFORNIA DEPT. OF TOXIC SUBSTANCES CONTROL
LINDA PRATT, SAN DIEGO COUNTY POLLUTION PREVENTION PROGRAM
FOLLOW-UP TO INDUSTRY DISCUSSION ABOUT OPPORTUNITIES FOR BETTER COORDINATION WITH GOVERNMENT, AND HOW AGENCIES CAN IMPROVE "CUSTOMER SERVICE".

NEW TECHNOLOGIES - COATINGS
COLEEN NORTHEIM, RESEARCH TRIANGLE INSTITUTE
SHARON JOHNSON, NORTH CAROLINA OFFICE OF WASTE REDUCTION
IMPACT OF NEW REGULATIONS PERTAINING TO HAZARDOUS AIR POLLUTANTS ASSOCIATED WITH COATINGS, AND A PRESENTATION ABOUT COATING TECHNOLOGIES.

PROGRAM UPDATES
KEVIN DICK, NEVADA SMALL BUSINESS DEVELOPMENT CENTER
GARY HUNT, NORTH CAROLINA OFFICE OF WASTE REDUCTION
OVERVIEW OF POLLUTION PREVENTION ACTIVITIES AND PROGRAMS WHICH ARE BEING IMPLEMENTED IN VARIOUS STATES. DISCUSSION OF DIFFERENT ELEMENTS OF STATE POLLUTION PREVENTION PROGRAMS.

WEDNESDAY, APRIL 28 (Continued)

BREAK 3:00 - 3:30 P.M.

Break Out Sessions 3:30 - 5:00 P.M.

FACILITY PLANNING EVALUATIONS

KIM WILHELM, CALIFORNIA DEPT. OF TOXIC SUBSTANCE CONTROL, POLLUTION PREVENTION PROGRAM
KEVIN McDONALD, MINNESOTA OFFICE OF WASTE MANAGEMENT
UPDATE ON FACILITY PLANNING EFFORTS IN SELECT STATES, INCLUDING EVALUATIONS AND MEASURES OF EFFECTIVENESS. IDENTIFICATION OF KEY FACTORS ATTRIBUTING SUCCESSFUL FACILITY PLANNING EFFORTS FOLLOWED BY DISCUSSION OF FACILITY PLANNING ISSUES.

EPA FISCAL YEAR 1994 GRANT GUIDANCE

TOM McCULLY, POLLUTION PREVENTION POLICY STAFF, U.S. EPA
LENA HANN, OFFICE OF POLLUTION PREVENTION, U.S. EPA
POLLUTION PREVENTION OBJECTIVES IN EPA GRANT FUNDING. BARRIERS PRESENTED FOR POLLUTION PREVENTION IMPLEMENTATION IN STATE GRANTS AS WELL AS TRADE-OFFS AND DISINVESTMENT THAT CAN BE CONSIDERED FOR IMPLEMENTATION OF POLLUTION PREVENTION PROGRAMS.

SOLVENT ALTERNATIVES: NO COMMON ANSWERS

VIC YOUNG, WASTE REDUCTION RESOURCE CENTER
CONSEQUENCES OF BANNING SPECIALIZED SOLVENTS AND OBSTACLES FACED IN FINDING REPLACEMENTS. DISCUSSION OF SOFTWARE AVAILABLE TO EASE THE PROBLEM AND A PRESENTATION OF SUCCESS STORIES.

FUNDING POLLUTION PREVENTION RESEARCH PROJECTS

MADELINE GRULICH, PACIFIC NORTHWEST POLLUTION PREVENTION RESOURCE CENTER
SURVEY OF FUNDERS OF POLLUTION PREVENTION RESEARCH PROJECTS, AS WELL AS OTHER PROJECTS. DISCUSSION OF AVAILABLE FUNDS AND AN OPPORTUNITY TO HEAR PERSPECTIVES AND RESPONSES TO FUNDING NEEDS DIRECTLY FROM THE FUNDERS.

DINNER 5:30 - 7:00 P.M. BEL AIR ROOM
DINNER SPEAKER: JOHN WISE, ACTING REGIONAL ADMINISTRATOR, EPA REGION 9

PLENARY SESSION 7:30 - 8:30 P.M.
"CONNECTING IDEAS FOR CLEARINGHOUSE DECENTRALIZATION"
SPEAKERS: DAVID LIEBL, UNIVERSITY OF WISCONSIN
TERRI GOLDBERG, NEWMOA
VIC YOUNG, WASTE REDUCTION RESOURCE CENTER
MODERATORS: DAVID THOMAS, DAVID KLING
FOCUS ON REGIONAL CLEARINGHOUSES - DISCUSSION OF VARIOUS PROGRAMS, IDENTIFYING THE PROBLEMS AND UNDERSTANDING THEIR STRENGTHS.

RECEPTION 8:30 P.M. TERRACE ROOM
"CONNECTING FOR DESSERT AND NEW IDEAS"

THURSDAY, APRIL 29

PLENARY SESSION 8:30 - 10:00 A.M.

CONNECTING FOR ENHANCED COORDINATION BETWEEN AGENCIES AND ASSOCIATIONS

SPEAKERS: GERALD KOTAS, DEPARTMENT OF ENERGY
JAMES EDWARDS, OFFICE OF FEDERAL FACILITIES ENFORCEMENT, US EPA
JOHN HANNUM, UNITED STATES NAVY
ELEANOR LEWIS, GOVERNMENT PURCHASING PROJECT

MODERATORS: GERALD KOTAS, DAVID THOMAS

PRESENTATION OF POLLUTION PREVENTION ACTIVITIES CURRENTLY UNDERWAY IN VARIOUS SECTORS OF GOVERNMENT, AND THE BENEFITS GAINED FROM BUILDING STRONGER COALITIONS BETWEEN AGENCIES.

BREAK 10:00 - 10:30 A.M.
SIGN UP FOR EVENING AD HOC SESSIONS

Break Out Sessions 10:30 A.M. - 12:00 P.M.

CLEARINGHOUSE DECENTRALIZATION

DAVID THOMAS, HAZARDOUS WASTE RESOURCE CENTER, UNIV. OF ILLINOIS
DAVID KLING, U.S. EPA OFFICE OF POLLUTION PREVENTION
FOLLOW-UP TO PLENARY SESSION TO FURTHER DISCUSS THE NEEDS OF THOSE WHO UTILIZE (OR WOULD LIKE TO UTILIZE) COMPUTER CLEARINGHOUSES.

INTERNATIONAL OPPORTUNITIES

LARRY LAI, WORLD ENVIRONMENT CENTER
INTRODUCE ROUNDTABLE MEMBERS TO INTERNATIONAL OPPORTUNITIES IN POLLUTION PREVENTION, AND THE CURRENT EFFORTS TO PROVIDE INTERNATIONAL ASSISTANCE, INCLUDING WEC AND USAID.

BENEFITS OF REGULATORY AND NON-REGULATORY POLLUTION PREVENTION PROGRAMS

DAVID HARTLEY, CALIFORNIA DEPT. OF TOXIC SUBSTANCES CONTROL
CINDY MCCOMAS, MINNESOTA TECHNICAL ASSISTANCE PROGRAM
DISCUSSION OF THE BENEFITS OF BOTH REGULATORY AND NON-REGULATORY PROGRAMS, PROVIDE EXAMPLES OF COLLABORATIVE EFFORTS, IDENTIFY COMPLEMENTARY ACTIVITIES AND SOURCES OF FUNDING.

INDUSTRY CASE STUDIES

RANDY PRICE, DUPONT CO.
JOHN WARREN, RESEARCH TRIANGLE INSTITUTE
PRESENTATION OF THE VARIOUS "DRIVING FORCES" THAT HAVE SUCCESSFULLY MADE POLLUTION PREVENTION A PRIORITY AT LARGE AND SMALL COMPANIES, AND UNDERSTANDING THE DIFFERENT CORPORATE CULTURES.

LUNCH 12:30 - 1:30 P.M. GARDEN TERRACE

THURSDAY, APRIL 29 (Continued)

Break Out Sessions 2:00 - 3:30 P.M.

FOSTERING POLLUTION PREVENTION IN THE NON-CORPORATE ARENA
Jack Luskin, Massachusetts Toxic Use Reduction Institute
Olga Corey, U.S. EPA Office of Pollution Prevention
Strategies for advocating pollution prevention through less traditional organizations.

REGIONAL AND STATE ROUNDTABLE INITIATIVES
Terri Goldberg, NEWMOA
Claire Rowlett, Office of Waste Reduction, EPA Region 10
Regional and state roundtable initiatives have been effective for coordinating information exchanges and program development throughout the country. This session will discuss the successes and challenges that are faced.

DESIGN FOR THE ENVIRONMENT
Kevin Dick, Nevada Small Business Development Center
David Kling, U.S. EPA Office of Pollution Prevention
Discussion of the EPA and private industry Design for Environment Initiatives and activities undertaken and planned by EPA, and the printing and electronics industry.

MAXIMIZING THE POTENTIAL OF LOCAL GOVERNMENTS
Kathryn Barwick, Department of Toxics, Pollution Prevention Program
Local government support for pollution prevention programs have been essential to the success of regulatory and non-regulatory programs. Includes case studies where states and EPA have leveraged resources by increasing the emphasis on local government programs.

BREAK 3:30 - 4:00 P.M.
LAST CHANCE TO SIGN UP FOR EVENING AD HOC SESSIONS

Break Out Sessions 4:00 - 5:30 P.M.

NON-REGULATORY PROGRAM FUNDING MECHANISMS
Gary Hunt, Department of Environmental Health & Natural Resources

REGULATORY INTEGRATION AND MULTIMEDIA IMPLEMENTATION
Lee Dillard, Massachusetts Department of Environmental Protection
Lynn Persson, Wisconsin Department of Natural Resources
Review of the latest issues including: EPA's source reduction review project update, options for multimedia pollution regulations, incorporating pollution prevention into enforcement actions, training for regulatory staff, work group products and future directions.

WASTE EXCHANGES
Donna Perla, U.S. EPA Waste Minimization Branch
Bob Smee, Pacific Materials Exchange
Presentation from CALMAX about what a waste exchange is and how they work, followed by a demonstration on the national electronic network recently developed by PME.

RETIRED ENGINEERS: TECHNOLOGY STOREROOM
Vic Young, Waste Reduction Resource Center
Donna Toy-Chen, City of Los Angeles HTM Office, Board of Public Works
Successes of State and local programs using retired engineers in training roles and waste reduction assessments as a means of transferring proven technologies to the industry work floor and preventing unnecessary waste due to lack of knowledge.

DINNER 5:30 - 7:30 P.M. On your own -- list of local restaurants available.

AD HOC SESSIONS 7:30 - 9:00 P.M.

FRIDAY, APRIL 30

Break Out Session 8:30 - 10:00 A.M.

TARGETING RCRA WASTE MINIMIZATION
Donna Perla, U.S. EPA Waste Minimization Branch
Focus on methods to target RCRA generated waste for source reduction and recycling opportunities. Discussion includes the CA Incineratable Waste Project and proposed EPA criteria for targeting RCRA wastes.

ORGANIZING ROUNDTABLE OUTREACH AND POSITION EFFORTS
Kevin Dick, Nevada Small Business Development Center
The purpose of this session is to provide a forum for persons interested in assisting the Roundtable with identifying issues, policies and rule making that the Roundtable should take a leadership role in reviewing and/or developing. Also discussed will be mechanisms to expand the outreach efforts of the Roundtable.

UNIVERSITY EDUCATION PROGRAMS IN POLLUTION PREVENTION
David Allen, UCLA - Chemical Engineering
A summary of the courses and educational materials developed at many universities, and a discussion of strategies for involving universities in pollution prevention programs.

(MORE) GOVERNMENT PARTNERSHIPS - AN EPA UPDATE
Jesse Baskir, Office of Pollution Prevention, EPA Region 9
Presentation of current and planned innovative projects that form unique federal, state, and private working relationships to foster pollution prevention. Includes EPA & electric utility partnership, the "Environmental Leadership" program, and the 33/50 program.

PLENARY SESSION 10:30 - 11:30 A.M

"Connecting Information from the Roundtable Board to the Members"

Speakers: James Lounsbury, Roundtable Executive Director
Dr. David Thomas, Roundtable Chairman

Report on the significant issues guiding the Roundtable, future directions, and opportunities for members to actively participate.

CLOSING REMARKS 11:30 A.M. - Noon

Speakers: Laura Yoshii, Deputy Director,
Hazardous Materials Management Division, EPA Region 9
David Hartley, Program Manager,
California Department of Toxic Substances Control

Conference officially adjourned-- we hope you have time to enjoy San Diego! ☺

POLLUTION PREVENTION - DIRECTIONS FOR THE FUTURE

Keynote Presentation

1993 Spring Conference
"Connections for Pollution Prevention"

National Roundtable of State Pollution Prevention Programs

San Diego, California

April 28, 1993

David J. Kling, Acting Director
Pollution Prevention Division
Office of Pollution Prevention & Toxics, 7409
202/260-3557

Eric V. Schaeffer, Director
Pollution Prevention Policy Staff
Office of the Administrator, 1102
202/260-8624

U.S. Environmental Protection Agency
401 M Street, S.W.
Washington, DC 20460

April 28, 1993

INTRODUCTION:

We're very pleased to be joining out State colleagues in San Diego today to discuss future directions in the Agency's pollution prevention, or "P2", program. Your conference is examining "connections for pollution prevention", and those connections, in light of President Bill Clinton's and EPA's Earth Day pledges to advance prevention, are more important than ever before.

In our time with you, we'd like to summarize some of the Earth Day initiatives and provide an overview of the Agency's approach to prevention, primarily by proposing five prevention themes, and actions associated with them, which illustrate our program. If you have questions, we'll be happy to take them at the end.

A couple preliminary points...

First, we'd like to thank the Roundtable and its members for your invitation to speak to the conference. We have long recognized that the primary governmental engine of prevention in this country has been, and remains, the State. At the federal level, we've learned a lot from your experiences and we feel that one of our most important responsibilities is facilitating your P2 work. We trust you'll see some tangible evidence of this commitment in our discussion today.

Second, we commend your efforts to work cooperatively with industry to achieve environmental results. While we at EPA take very seriously our obligation to regulate and enforce our Nation's environmental laws, we work hard to accomplish environmental protection in a manner which helps keep American industry prosperous and competitive.

THE EARTH DAY MESSAGES:

Pollution prevention, as you may have heard, has ceased, as of Earth Day last Thursday, being just another priority for the U.S. Environmental Protection Agency; **it has now become the priority.** In the words of Carol Browner, EPA's new administrator, the Agency is now "committed to making pollution prevention the guiding principle in all our environmental efforts". EPA, working through a new task force and by other means over the next few months, will adopt a major policy integrating P2 into every EPA activity, program, and operation. As she further observed:

> Historically, pollution prevention has been a series of special projects. By the policy I am announcing today, pollution prevention will be the central ethic in everything we do at EPA.

Her message followed President Clinton's Earth Day address which, many of you may recall from the news, pledged the United States to sign the biodiversity treaty to slow the loss of species - an action we denied during the Rio Earth Summit last June. In addition, the President set forth a number of other initiatives, including several that advance prevention. For example:

- He directed EPA and other federal agencies to prepare an executive order that will require federal facilities that manufacture, process, or use toxic chemicals to publicly report their wastes and releases under the federal right-to-know laws.

It is time, he said, "that the United States government begins to live under the laws it makes for other people". The federal government will have a voluntary goal of 50 percent reduction of its toxics releases by 1999.

- He signed an executive order directing federal agencies to change their procurement policies to reduce the use of ozone-depleting substances in anticipation of their phase-out under the Montreal protocol.

The protocol, an international treaty to protect the earth's upper ozone layer, sets a 1995 deadline for the complete phase-out of these depleting agents, found in refrigerants used in building and auto air conditioning systems.

- He asked for an executive order to promote the use of recycled and recovered products by increasing their purchase by government, which will strengthen markets for them and create new jobs.

- He will sign another executive order committing the federal government to accelerate the purchase of alternative fuel vehicles as its fleet expands.

- Yet another executive order will require the federal government, the world's largest purchaser of computer equipment, to buy energy-efficient computers, many of which are now being introduced through one of EPA's P2 "green" programs, Energy Star Computers.

Energy Star Computers is a voluntary EPA partnership with computer industry leaders to supply desktop computers, monitors and printers that enter a low-power stand-by State when they are inactive. This order should save taxpayers $40 million a year.

- And saying "before I ask you to do the best you can in your house, I ought to make sure I'm doing the best I can in mine", he ordered an energy and environmental audit of the White House to make it "a model for efficiency and waste reduction".

In addition, the Department of Commerce will develop a strategy to increase exports of U.S.-made environmental technologies and create new "green GDP" measures to improve existing economic statistics that ignore the cost of pollution or the value of clean air. The Interior Department will conduct a national biological survey to gather, analyze and disseminate biological information and to foster increased understanding of the America's biological resources. Each of these efforts will advance the cause of prevention.

POLLUTION PREVENTION:

Indeed, the cause of prevention has come a great distance in a short time. As you know, when EPA was created about 23 years ago, immediate and very compelling environmental needs

focused us squarely on specific pollution control and clean-up problems. In those days, flames burned on the Cuyahoga River in Ohio, and air pollution was so thick in places that you could almost touch it. These pressing problems drew our attention to the top of the smokestack and the end of the pipe to intervene, essentially at the margin, to stem the tide of pollution - pollution which we were still creating.

As initial problems came under some control, we began to look further upstream, beyond the visible effects in our streams and air, to the hazardous chemicals, products and processes at the true source of the problem. And it was not EPA bureaucrats in Washington or the nation's environmental community that led this effort. It was industry - industries which through foresight, civic altruism, "enlightened self-interest", or perhaps, a measure of each, recognized the wisdom of preventing pollution in order to avoid the burden and cost of recycling, treatment or disposal later on.

Today, pollution prevention programs at every level of society are evolving in dynamic new ways, reaching beyond traditional approaches to motivate change in peoples's behavior. Inside EPA, P2 has become a wedge for advancing risk-based decision making, multi-media approaches, and imaginative new models for government/industry interaction. We also see it as an important opportunity, as Vice President Al Gore and others have suggested, to capitalize on the "inter-generational" benefit. By preventing pollution now, we are minimizing the environmental burdens and financial legacy of pollution which our children must bear.

In developing our P2 program, we were aided by the passage of the Pollution Prevention Act of 1990, a law that makes prevention a national policy and establishes a hierarchy of environmental management. In this hierarchy, pollution prevention (also called "source reduction") is at the very top as the most preferred approach, followed by recycling, treatment, and finally, disposal.

Incidentally, prevention is very much alive as a legislative issue. Last year, Senator Frank Lautenberg (D-NJ) and others sponsored new "right-to-know more" legislation, which would enhance EPA's current authorities to collect and disseminate chemical information under the Emergency Planning and Community Right-to-Know Act (EPCRA), first passed in 1986. This "right-to-know more" bill would expand both the categories of industries and types of chemicals which must be reported through EPA's Toxics Release Inventory (TRI), created by EPCRA so you - as a citizen - can discover how much of what kinds of chemicals which the firms, and by the President's recent Earth Day decision, the federal facilities in your community are emitting into our air, water, and land.

For awhile, "right-to-know more" was a component of the Resource Conservation and Recovery Act - the RCRA - reauthorization effort last year, which ultimately fell short. But it has continued prospect either alone, or in concert with other environmental legislation, as congressional staff, now preparing new RCRA, Clean Water and even Superfund bills, consider a variety of prevention approaches.

David J. Kling and Eric V. Schaeffer, "Pollution Prevention - Directions for the Future"

EPA'S P2 ACTIVITIES:

Turning now to EPA's pollution prevention activities, five themes, underscored by the Administrator in her Earth Day message, characterize and guide our current and future prevention efforts.

1. **Make prevention the principle of first choice in the mainstream work of the Agency.**

2. **Help build and facilitate a network of prevention programs,** particularly **among states and local governments.**

3. **Identify and pioneer new environmental programs** which emphasize cross-media prevention, reinforce the mutual goals of economic and environmental well-being, and represent new models for government/industry interaction.

4. **Generate and share information to promote prevention, track prevention progress through measurement systems, and recognize our successes.**

5. **Develop partnerships in technological innovation with the private sector.**

We will examine our progress on each one, and point out new initiatives identified by the Administrator many of which the Agency's new P2 task force will be empowered to advance.

1. Prevention as the preferred approach:

Prevention is now the environmental principle of first choice in the mainstream work of the Agency and the federal government, as well as the preferred means to enhance environmental stewardship throughout society. As the Administrator stressed, we must walk the P2 talk by bringing multi-media prevention to our ongoing regulatory and program agenda - everything we do at the EPA, from rule making and enforcement, to training and state grants.

How is this being done? One initiative now underway is the Source Reduction Review Project (SRRP), a cross-media effort within the Agency to incorporate P2 into statutorily-mandated regulations for 17 industrial categories. Under SRRP, each EPA office must consider source reduction measures as a primary means of obtaining compliance with the desired standard. Categories include effluent guidelines for water, hazardous waste RCRA listings and air toxics standards for such industrial categories as pulp and paper production, pharmaceuticals and metal products and machinery, as well as solvents, paints, coatings and adhesives.

The project is adopting a multi-media approach to avoid creating an "environmental merry-go-round" where pollution in one environmental medium is merely shifted or transferred to another - from air to water, or from water to land. The Administrator, last Thursday, pledged to direct

the new P2 task force to develop cross-program industry clusters for these categories to better avoid transfers.

In addition, EPA's Office of Enforcement now includes pollution prevention conditions in compliance and enforcement settlements when appropriate. Through supplemental environmental projects, or SEPs, violators can mitigate their fines and penalties by applying P2 practices in their operations.

EPA Region I in Boston is working closely with the Massachusetts Department of Environmental Protection on its Waste Prevention FIRST project - Facility-wide Inspections to Reduce Sources of Toxics. This cross-media inspection, compliance and technical assistance effort has challenged the Agency to examine more closely the prospect of integrated multi-media inspection, unified EPA compliance reporting systems as well as more risk-based inspection targeting.

We have developed a comprehensive Agency P2 training program which includes both general prevention training and orientation for all employees as well as specific instruction for rule writers, permitters and other EPA staff. We also provide our basic training components to outside groups, including other federal agencies, the states, universities and private industry to help in their efforts.

One of the most creative sources of P2 ideas inside EPA has come from a budget re-allocation resulting from an Agency-wide competition for innovative pollution prevention projects. This competition was funded by setting aside 2% of the Agency's entire 1991 and 1992 program budgets. All EPA offices then competed to win this money back with the most compelling P2 project ideas. Twenty-five projects were selected and the results point the way toward the next generation of pollution prevention activities. Overall, EPA intends to increase its prevention program budget by more than 70% in 1994 to over $70 million.

Recent Agency guidance has also provided more flexibility in EPA media grants to support state pollution prevention activities, which we will discuss later.

We've targeted several economic sectors for special P2 emphasis. For example, EPA has been working closely with the Department of Agriculture (USDA) to adapt and apply a pollution prevention approach to American agriculture with the goal of keeping America's farming sector on a healthy environmental and economic footing. An Agency team is currently developing specific initiatives to apply a joint agriculture P2 strategy, and both EPA and USDA have committed funds to the effort.

Like the President, EPA is also working to help put the federal government's P2 house in order - developing a pollution prevention approach for the federal sector. The goal is to promote source reduction among federal agencies in their various capacities: as generators of hazardous and solid waste, as major purchasers of goods and services, and as policy-makers, regulators and

educators. The new toxics reporting requirement, announced by President Clinton, is a key initiative here, although we've been working with several agencies which already voluntarily report.

2. Network of State and Local Programs:

We understand it is critical for EPA to develop and strengthen state and local P2 programs, and to facilitate their coordination. The "face of government" on environmental issues, especially source and toxic use reduction, is increasingly at the state level. No one appreciates this more than our new boss, Carol Browner, who was the chief environmental official in Florida before coming to Washington.

EPA's current assistance comes to you in the states in several forms, including grant funding and technology transfer.

As we mentioned above, EPA's substantial media grants can now better support more state P2 projects and core programs. New Agency guidance issued late last year will allow our major media and operating programs more flexibility to promote prevention as they allocate about $500 million to support state operating programs for permitting and compliance inspection. The Administrator, in her message last week, said she would direct the task force to develop programs to enable state, local and tribal governments to make the maximum use of the flexibility we have provided in these grants to develop prevention programs. You'll need to talk to our colleagues in EPA's Regional offices about the new prevention opportunities you see.

In 1993, EPA will also provide about $6.8 million in P2 grants to states specifically for P2 program development - an amount comparable to the last several years. This supplemental funding has helped state toxic use reduction and other similar programs take root and expand their prevention activities.

Finally, EPA has established a pollution prevention information clearinghouse (PPIC) to share a wide variety of prevention information, including industrial case studies. The clearinghouse, for a variety of reasons, has not been the kind of network we would have wished. In fact, state P2 officials have been a prime source of ideas to improve the PPIC and its companion hotline. We want to establish a cooperative agreement with the Roundtable to assess the PPIC and identify steps in the next year to more fully realize its original promise and meet our expanding need for P2 information. If it appears from the assessment that a group like the Roundtable can manage the PPIC better than EPA has, we'll take that recommendation to the Administrator.

3. New Environmental Approaches:

We will continue to identify and pioneer new environmental approaches and programs which emphasize cross-media prevention, reinforce the mutual goals of economic and environmental well-being and offer imaginative new models for government/industry interaction.

EPA has launched a series of innovative programs designed to capture industry's attention and interest while engaging business in projects that will achieve real environmental benefits. The programs have mostly involved industry in voluntary P2 projects that feature collaboration rather than confrontation and, as we noted earlier, the Agency is putting more money into them next year. Our premise is that once more industrial leaders understand the economic benefits of prevention and receive the appropriate technical information and incentives, they will come to champion P2 on their own.

Examples? The voluntary 33/50 Program initiative to reduce toxic waste generation from major industrial sources is expected to achieve substantial P2 results in a relatively short time. Under this program, EPA has targeted 17 chemicals for reductions of 33 percent by the end of last year - 1992 - and 50 percent by the end of 1995. Many of the 17 program chemicals, which include benzene, cadmium, carbon tetrachloride, chloroform, chromium, cyanide, lead and mercury, are of considerable concern and pervasive in our environment.

Since the 33/50 Program's inception in February, 1991, EPA has received commitments from about 1,000 U.S. companies - some of the firms represented here today. These commitments translate into a minimum of 340 million pounds of toxic emissions reduction by 1995. EPA is halfway to reaching its goal of commitments for a reduction of 700 million pounds.

In many ways, the 33/50 Program is a pilot for us. EPA is learning much about the way American industry makes decisions regarding waste generation and management; simultaneously, industry is learning more about how EPA makes its decisions and translates those decisions into regulatory and non-regulatory action. The public is watching at close range the capability and concerns through a voluntary and flexible program.

Another exciting initiative is the "Green Lights" program, an aggressive, non-regulatory effort to reach corporate decision-makers with information on new energy-efficient lighting technologies. Over 270 corporate partners plus at least 12 states have signed on so far, committing themselves to use more efficient technologies to light some 2.65 billion square feet of space. EPA estimates that every time an ordinary incandescent light bulb is replaced with an energy-efficient compact fluorescent bulb, carbon dioxide emissions are reduced by 300 pounds a year.

Other "green" programs are now emerging, like the Energy Star Computers program highlighted by the President. One of our latest "green" programs, the new "Natural Gas Star" program to cut greenhouse gases, was announced on March 9th. EPA has joined with 14 of the nation;s leading natural gas transmission and distribution companies to accelerate the use of cost-effective technologies and practices to prevent methane emissions into the atmosphere, which was a major reduction commitment we made at the Rio Earth Summit last year. Methane is a potent greenhouse gas, 20 times more powerful than carbon dioxide in trapping heat in the earth' atmosphere. EPA estimates that the new Natural Gas Star program will reduce methane

emissions by one million metric tons by the year 2000 - equivalent to the carbon dioxide reductions achieved by removing three million cars from the road.

EPA's Office of Water has established WAVE, or Water Alliances for Voluntary Efficiency, a joint program in which some of the nation's leading hotel and motel chains have pledged to institute important water conservation practices in their facilities. Our Office of Research and Development is working with the American Institute of Architects to prepare an environmental resource guide to promote prevention and environmentally-sound design and construction.

Finally, a most promising effort is the new Design for the Environment, or DfE, program, launched to encourage the design of safer products and processes. A separate Roundtable session has been devoted to this new enterprise later during the conference. Improved technologies lie at the heart of DfE. EPA wants to help make available meaningful information and help promote new analytic tools and approaches to better guide industrial design decisions.

How does DfE work? It builds on current trends to rethink and modify business operations from an environmental perspective. DfE, as we see it, is already at work in some of your plants. BMW, for example, has designed a car with disassembly in mind. INTEL is developing its computers to maximize chip recovery. Accordingly, DfE thinking begins at the initial design phase, and strives to reduce or eliminate pollution on the drawing board.

Under DfE, EPA focuses Agency resources and provides information in ways which help an industrial designer make an environmentally responsible choice. It offers a forum, apart from rule making, for offering EPA's views and preferences on process and product design, through our policies on toxicity, for example. DfE continuously provides this information in Agency risk assessments and substitute analyses to help inform and empower industry. DfE won't work if industry isn't a willing and active partner. It is our collaborative interaction which will light the way to better design decisions.

While DfE may eventually have many manifestations, EPA is currently directing its energies in two major directions: toward certain industrial processes or chemical use clusters on one hand, and at a few select professional activities, on the other.

With regards to industrial processes, there appears to be substantial prospect on the dry cleaning front. We've been working with the Neighborhood Cleaners Association and others in the industry to pioneer a new "wet" cleaning technology, based on some British and German experiences. This process replaces perchloromethylene (perc.) with steam and gentle soap. A demonstration project in New York and Florida was successful, and some of you may have seen former Administrator William Reilly on the Cable News Network last Autumn take his laundry to a cleaner near EPA headquarters which participated in a higher volume test.

In the dry cleaning effort, we're sharing our considerable information and knowledge of chemical substitutes in solvents and for cleaning with the industry. We're offering

environmental evaluations, in the form of substitute and risk assessments, of these alternative cleaning technologies and processes. Finally, our good offices are being used, with industry, to pilot and promote a new approach which may lead to environmental improvement.

A DfE project on printing, another of our industrial process efforts, is examining, in cooperation with industry, alternative dyes and inks which have less environmental impact. We've also provided grants to six university research groups exploring alternative synthetic pathways - ways to design safer chemicals, which generally lead to safer products. The National Science Foundation may help us expand this chemical design activity.

As to some of our DfE projects aimed at professional activities:

- We're working with property and casualty underwriters to develop an insurance incentive for P2, and they seem very interested. Our first cut is at training materials they use in their profession.

- We're scheduling a national accounting workshop to encourage and standardize total cost assessments which will allocate overhead to processes and material decisions which fail to prevent pollution.

- We're helping the nation's mortgage bankers to incorporate environmental emissions and other information in their investment decisions.

- We've helped establish the National Pollution Prevention Center for Higher Education at the University of Michigan to develop P2 instructional modules for graduate and undergraduate engineering and business curriculum nationwide. In effect, we're redesigning young engineers and business managers to think pollution prevention, instead of pollution control, when they first walk onto the job.

As a parting observation on DfE, we'd encourage each of you to think about the industrial products and processes you design, manage or regulate, and how redesign might improve their environmental impact. Then think of your colleagues at EPA. Maybe we can help.

4. Information Generation, Tracking and Recognition:

We need to identify, generate and disseminate environmental information that advances preventive approaches and empowers the public. We also need to "keep book" on P2 progress and document real achievements to build public credibility. Here, we feel EPA must serve as an honest broker who recognizes genuine success but also uncovers false claims of public health and environmental protection.

One of the most powerful environmental changes that has occurred in this country was the passage of the Emergency Planning and Community Right-to-Know Act (EPCRA) in 1986.

Thousands of companies are required under EPCRA to report annually to EPA the types and quantities of toxic chemicals which they release to the environment. EPA's compilation and public dissemination of this information through the Agency's Toxics Release Inventory (TRI) has become a cornerstone of efforts by EPA, industry, environmental and community organizations to identify, target, measure and **reduce** toxic chemicals in our communities. Again, President Clinton has announced that all federal agencies will now report to TRI.

EPA has devoted considerable attention to what type of P2 information should be collected and how the information should be use to measure progress. Last year, EPA issued a new data collection form ("Form R") to collect P2 information as part of the TRI reporting requirements. Over the next few years, we will be improving our methods for measuring progress as new data are received, analyzed and shared with the public.

EPA has been considering TRI expansion over the past couple years and the Administrator has directed that the new task force, among other things, examine expansion opportunities for both chemicals and industrial sources.

EPA is also using information to achieve change in the consumer sector through environmental or eco-labeling. We are working closely with the Federal Trade Commission (FTC) and the U.S. Office of Consumer Affairs to provide a coordinated and cohesive national response environmental labeling and marketing claims. This past summer, the FTC announced new guidelines for such advertising claims and labels. The guidelines are intended to reduce consumer confusion and prevent the false or misleading use of terms such as "recyclable", "degradable" and "environmentally friendly".

We expect that this will be an area of increasing interest and attention as consumers seek more reliable information in the marketplace to act effectively on their concerns for the environment. We are paying close attention to the experience of other countries, including Canada, with ecological labeling and environmental marketing claims programs.

Finally, the Agency has proposed a framework for its new cross-industry Environmental Leadership program. This program, still in the comment and design phase, would formally recognize companies which sport strong environmental compliance records and adopt and follow stringent environmental codes.

5. Partnerships in Technological Innovation:

To have a truly effective pollution prevention program at EPA, we must look beyond our own resources to cooperative efforts with other agencies and organizations. Developing partnerships can create greater awareness of P2 opportunities and harness the resources and technological capabilities of others. Of our five themes, this is the newest but it has substantial potential.

The President's 1994 budget proposal for EPA includes $36 million for a new inter-agency Environmental Technology Initiative and Agency offices, led by our Office of Research and Development, have already begun to identify interesting project ideas. The Administrator sees this as a multi-year program and a substantial portion of these 1994 funds will be used to promote P2, particularly for small business. We know many of you will be interested in this program as it develops.

We have undertaken other efforts with the participation of a number of different groups. For example, in 1991, EPA initiated a jointly-funded grant program with DOE to support, through the states, waste minimization/energy efficiency demonstration projects in the industrial setting. This program is called "National Industrial Competitiveness through Efficiency: Energy, Environment, and Economics" (NICE^3), and is supporting new processes and equipment which can significantly reduce high-volume wastes in industry, conserve energy and improve industrial cost-competitiveness. We are working with state energy and environmental offices to provide about $2.5 million in grants this year.

Perhaps even more importantly, DOE's national laboratories have taken the lead in pioneering new technologies through large cooperative ventures with U.S. companies and DOE has asked us to help them make sure that those technologies are "green". Many of these labs have traditionally been major suppliers of our national defense technology. As the labs increasingly turn to domestic applications, we want to help them reduce any adverse environmental impacts.

SUMMARY:

In summary, EPA's pollution prevention program, like many of yours in the states, has gone through a period of rapid development and growth over the last few years. The five themes discussed here, and by the Administrator last week, point to a continuing dynamic effort in the future, one that seeks sustained institutional change and innovative new program approaches, expands and empowers P2 partnerships with you and others, harnesses information and improves measures and recognition, and facilitates greater state and local P2 infrastructure.

As we take up the Administrator's new challenge and labor to truly make prevention the central environmental ethic at EPA, we offer our efforts to you as you endeavor to make it the primary means to enhance environmental stewardship throughout our society. We look forward to a strong partnership with you in accomplishing this vital mission.

PLENARY SESSION SUMMARY

SESSION NAME: Connecting to the Needs of Our Customers

MODERATOR(S) NAME: Linda Giannelli Pratt
David Hartley

NAMES OF SPEAKER: Barbara Bush, American Petroleum Institute
Joe Lucas, Inland Technology
Robert Ferrone, Digital

DAY AND TIME OF SESSION: Wednesday, April 28 at 10:45 a.m. - noon

SUMMARY:

The speakers brought forth three perspectives about what has motivated their company or association to pursue pollution prevention opportunities.

Ms. Bush emphasized the importance of government making itself available not so much for technical assistance to businesses, but rather to establish avenues for the agencies to coordinate efforts for permit streamlining. She described the educational outreach program developed and implemented by A.P.I., and the success in terms of waste reduced.
(partial set of overheads follows)

Mr. Lucas provided a case study of a small chemical manufacturing company that had serious challenges with environmental regulatory compliance. Through the development of a bold new strategy, Inland Technology has developed new product lines that are successfully being used as "safer substitutes". He described how the process of designing a pollution prevention program, and the subsequent results, transformed a "sleepy company" into an international powerhouse which is now dedicated to helping other organizations with solvent substitutions.

Mr. Ferrone spoke not only of the activities within Digital, but also explained the value of industry forming an advisory committee, and proactively work with government agencies. There is tremendous value in pulling together all of the "players" in the conception phase of a project, e.g. EPA's "Design for the Environment". (partial set of overheads follows)

POLLUTION PREVENTION: REFINERY CRUDE UNIT STUDY

- Purpose: Identify and evaluate realistic PP design and construction options for a typical refinery crude unit

- Idea generation: Used brainstroming sessions, combined team participation, broad spectrum of specialists, and considered all environmental media

- Findings: Generic methodology can be applied, correlation exists between energy efficiency and PP, and reductions in all media can be obtained

POLLUTION PREVENTION MEASUREMENT: SOLID WASTE SURVEY

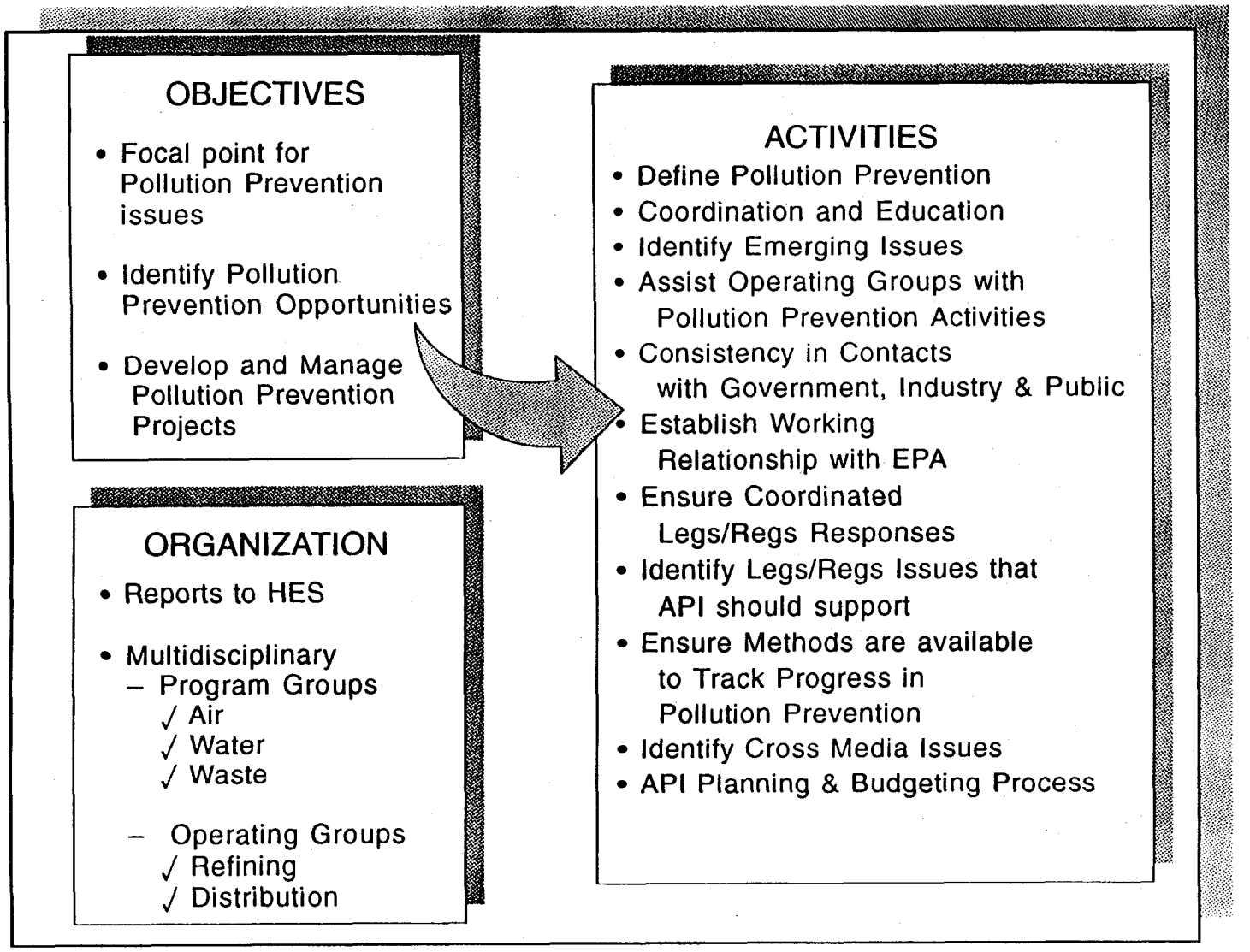
- Scope: All US operating refineries

- Objectives:
  1) Document management of waste management trends
  2) Evaluate factors influencing waste generation
  3)Establish accurate baseline
  4)Gather data on waste reduction

- Organization: Waste Management Hierarchy

E. Lusch API

POLLUTION PREVENTION TASK FORCE


OBJECTIVES
• Focal point for Pollution Prevention issues
• Identify Pollution Prevention Opportunities
• Develop and Manage Pollution Prevention Projects
ORGANIZATION
• Reports to HES
• Multidisciplinary
– Program Groups
✓ Air
✓ Water
✓ Waste
– Operating Groups
✓ Refining
✓ Distribution
ACTIVITIES
• Define Pollution Prevention
• Coordination and Education
• Identify Emerging Issues
• Assist Operating Groups with Pollution Prevention Activities
• Consistency in Contacts with Government, Industry & Public
• Establish Working Relationship with EPA
• Ensure Coordinated Legs/Regs Responses
• Identify Legs/Regs Issues that API should support
• Ensure Methods are available to Track Progress in Pollution Prevention
• Identify Cross Media Issues
• API Planning & Budgeting Process

Changing Environmental Climate

- ★ Increasing stringent regulations
- ★ Growing public awareness and concern
- ★ Interest groups gaining more attention
- ★ New Administration commitment to environment
- ★ Decreasing landfill space and rising costs
- ★ Increasing liability associated with waste generation, i.e. hazardous
- ★ Pressure from international advances in environmental arena
- ★ Environment= Global,competitive, strategic

ERA	1970s → compliance	Late 1980s → pollution Reduction	Pollution Prevention	1990s Environmenta Strategy
Key Drivers	Regulation	Regulation Cost	Regulation Cost Reduction Efficiency	Market satisfaction Regulation Competition Global change
Focus	Control effluents outside plant	Manage process on plant floor	Redesign process at manufacturing	Competitive positioning product and package development Capture revenue Measure performance Marketing
Parts of firm affected	Environment	Environment operations management	Environment management Manufacturing Supplier management	Distribution Product development TQM Finance

source: Abt Associates Inc.

JAPAN	RITE (Research Institute of Innovative Technology for the Earth) NEDO (New Energy & Industrial Technology Development Organization)	Founded 1990 MITI-sponsored research INstitute: greenhouse warming main initial target MITI-origin:Environmental technology one of four areas of R&D support.	>$1billion cooperative national, local,private funding $1.8 billion(1990)
GERMANY	BMFT (Ministry for Research and Technology) STATES	4 progams;environmental technology;R&D funding and demonstration. Similar to national	$470 million (5%R$D budget) 23%national R$D total.
NETHERLANDS	TNO (longstanding technical reseach, tech. transfer organization)	Contract research and technical assistance to industry.	envir-tech App. 10% portfolio
ITALY	TIF (TECHNOLOGICAL INNOVATION FUND)	1990 research and pre commercial Devp. loans. Envi priority sector Projects in all other areas require assessment of enviro-benefit.	BEFORE 1990 5% ENVIRO; WILL INCREASE
CANADA	tech. for environmental solutions (combines science &Environment Ministries)	1991- Three componets: Demonstration, tech-transfer & info network.	$100 mill.

WRI

SESSION SUMMARY

SESSION NAME: Understanding The Needs of Industry

FACILITATOR(S) NAME: Linda Giannelli Pratt
David Hartley

DAY AND TIME OF SESSION: Wednesday, April 28, 1993, 1:30 - 3:00 P.M.

APPROXIMATE NUMBER OF PARTICIPANTS: 40

OBJECTIVE OF SESSION:

The objective of the session is to present the driving forces that foster pollution prevention within business, and to illicit ideas that would redefine the role that government and other sectors of the community could assume to provide more assistance.

Concluding Remarks:

1. When redefining the roles of government and industry, understand that the responsibilities of the various levels of government (Federal, state and local) are very different, as are the needs of different types of industry.
2. Greater attention should be given to understanding the abilities and the constraints of government agencies, and reduce the redundancy of activities between Federal, state and local agencies, i.e., leverage resources more effectively.
3. We need to step back from ONLY technology transfer and learn more about ECONOMICS (e.g., NEMOA - Terri Goldberg has curriculum package).

KEY POINTS MADE BY SPEAKERS AND PARTICIPANTS:

Speakers:

Barbara Bush, American Petroleum Institute
Joe Lucas, Inland Technology
Robert Ferrone, Digital

Role of Government in funding education:

- Survey summary of activities in universities - UCLA copies available from Doug Moody
- Expend more time and resources in identifying appropriate players, and encourage interaction and exchange of information from the inception of the project
- Transition from voluntary to mandatory pollution prevention needs much more interaction and education for development of regulations

Session Name - Understanding the Needs of Industry

Communication Tools:

- "Industry" is not generic - many different needs, including: chemical user vs. manufacturer, and small vs. large
- More emphasis on environmental cost accounting
- Address concerns about capital outlay to start projects - e.g., SCAQMD
- Utilize the multi-agency connections, trade associations and insurance companies/lending institutions

Role of Trade Associations and Consortiums:

- Varies based on strength of association
- Sometimes the "driver" to get businesses more involved with trade association is based on NEED, such as help with regulations, and sometimes agencies (DOE) can be a "driver"
- Need to transfer information of resources available to smaller business - e.g., national labs

Technology Development:

- Find out needs first, get customers lined up first, then do technology R&D

Concerns from Large Companies:

- bond rating
- lots of government loans/programs available to small - not large companies
- diminishing returns $ after "low hanging fruit" is picked (re-tooling)

Miscellaneous Concerns:

- Government needs to hit the streets and do more entrepreneurial activities
- Revolving loan fund for pollution prevention (e.g., Connecticut)
- Use existing mortgage co. for small business loans (to their benefit) - Washington State
- "Clean Screen" leverage in Louisiana proposed
- Center for Neighborhood Technology good example of partnerships (Chicago)

RECOMMENDATIONS FOR FURTHER DISCUSSION/ACTION:

- Provide a list of key contact people for referrals
- Update directory
- Evaluation from business as to what seems most helpful
- Connect with Trade Association (AIPP).
- Randy Price *(Business Roundtable - top 200 companies) (Nat'l Assoc. of Mfg.)
- Help programs develop priorities for targeting businesses (Ecological Risk Resource Group - CA)

SESSION SUMMARY

SESSION NAME: New Technologies: Coatings

FACILITATOR(S) NAME: Coleen Northeim
Sharon Johnson

DAY AND TIME OF SESSION: 4/28, 1:30 - 3:00

APPROXIMATE NUMBER OF PARTICIPANTS: 37

OBJECTIVE OF SESSION:

Transfer technology on coating materials, application systems and industry perspectives.

KEY POINTS MADE BY SPEAKERS AND PARTICIPANTS:

1. Overview of coating formulations and application techniques was presented.
2. Based on a study done in Washington State, training was found to be a more important factor in transfer efficiency than equipment selection. Study was done in a wood door manufacturing facility.
3. The aerospace industry expressed concerns for product safety and performance when changing to new coating formulations of new coatings for products that are designed to last 20 years or longer.
4. The variety of different State regulations result in excessive management burdens for industry.

RECOMMENDATIONS FOR FURTHER DISCUSSION/ACTION:

none - ran out of time

FOLLOW-THROUGH, INCLUDING CONTACT NAMES AND PHONE NUMBERS FROM PARTICIPANTS WHO COMMIT TO WORKING ON THIS ISSUE, AND ANY MILESTONES WITH APPROXIMATE TIMELINES:

This session was not designed for board follow-up, but as an information session.

OUTLINE
REGULATORY NEGOTIATION UPDATE

I. WHAT IS NEGOTIATED RULEMAKING?
   A. Process to bring together representatives of various interest groups and a federal agency to negotiate the text of a proposed rule.
   B. Hopefully build consensus.
   C. Allows more direct input from affected parties
   D. Rule easier to understand by regulated community
   E. Reduce the likelihood of litigation following rule development

II. NEGOTIATED RULEMAKING FOR THE WOOD FURNITURE SOURCE CATEGORY
   A. Characterization of the source category
      1. Includes wood furniture, kitchen cabinet, and architectural woodworking manufacturers, etc.
      2. Over 10,000 facilities in the U.S. - Over 70% have fewer than 20 employees.
      3. VOCs and HAPs are generally the same chemicals
   B. 1. Previous work
      2. EPA - Draft CTG - Emphasizes incineration, solvent recovery, and low-VOC coatings (waterborne, high-solids, UV curables, etc.)
      3. Industry - Joint Industry Study - Emphasizes need for flexibility and VOC reduction rather than control
      4. EPA - Data Collection
         a. Surveyed 900 companies
         b. Low response rate (43%)
         c. "Surprising" results
   C. Reg-Neg will address both CTG and MACT development
      1. CTG
         a. Addresses VOC emissions particularly for non-attainment areas
         b. Due by November 1993
      2. MACT (NESHAP)
         a. Addresses Hazardous Air Pollutant emissions (189 chemicals)
         b. Due by November 1994
   D. Reg-Neg Committee
      1. Furniture Industry
         a. Manufacturers
         b. Trade associations
      2. Coatings Industry
         a. Solvent manufacturers
         b. Resins manufacturers
         c. Coatings formulators
      3. State environmental regulators
      4. Public interest groups
      5. Pollution Prevention Interests

E. Issues to be resolved
   1. How to segment industry
      a. EPA - 5 segments based on finishing process
      b. Industry - 10 segments based on
         (1) finishing before vs. after assembly
         (2) roll coating vs. spray coating
         (3) long vs. short finishing sequence
         (4) laminated before or after assembly
         (5) order of upholstering, finishing & assembly
   2. Defining the MACT floor and CTG reduction level
   3. What form of standard to use (lbs./gal., percent reduction, etc.)
      a. Industry - One number approach
         (1) Average VOC content for all coatings used
         (2) Provide flexibility - can use high-VOC coatings with other reduction/control options
         (3) No credit for reducing material usage
      b. EPA - Must be measurable and enforceable
   4. Permitting, Enforcement, and Recordkeeping
   5. Measurement Issues
      a. Transfer Efficiency
      b. Water content
      c. Solids content
      d. Surface area coated
   6. Market based incentives
      a. Emissions averaging
      b. emissions trading
      c. fees
   7. Deminimus cutoff
      a. CTG - 2.7 tons/yr.
      b. MACT - Major sources vs. area sources
   8. How to coordinate MACT & CTG implementation

III. OTHER ACTIVE NEGOTIATED RULEMAKINGS
   A. Architectural and Industrial Maintenance Coatings
      1. CAA Section 183(e) requires EPA to regulate VOC emissions from commercial/consumer products
      2. AIM coatings = 20% of all commercial/consumer products VOC emissions
      3. Considering limiting VOC content
      4. Possibly use economic incentives
      5. Expected to end in May 1993
   B. Revision of Hazardous Waste Manifest
      1. ASTSWMO petitioned EPA to standardize manifest
      2. Improve retrieval and dissemination of manifest information
      3. Expected to end in June 1993

Typical Transfer Efficiency Ranges for Various Application Methods

Application Type	Typical Transfer Efficiency Ranges (10 30 50 70 90)
Low-Volume High-Pressure AIRSPRAY	25 — 50
High-Volume Low-Pressure AIRSPRAY	40 — 70 35 — 65
AIRLESS	
AIR-ASSISTED AIRLESS	40 — 70
ELECTROSTATIC AIRSPRAY	35 — 60
ELECTROSTATIC AIRLESS	40 — 70
ELECTROSTATIC AIR-ASSISTED AIRLESS	45 — 75
ROTARY (All are electrostatic)	60 — 90

LOW VOC COATING TECHNOLOGY
Accomplishments in Aerospace

- **TOPCOATS**
  VOC REDUCTION: 600 TO 420 G/L VOC
  AIR TOXICS: CHROME ELIMINATION
  ELIMINATION OF LEAD AS COLORANT [RED/ORANGE]

- **PRIMERS**
  VOC REDUCTION: 600 TO 350 G/L VOC
  AIR TOXICS: RESEARCH FOR ALTERNATE TO CHROME

- **COATING APPLICATION EQUIPMENT**
  HIGH VOLUME-LOW PRESSURE [HVLP] SPRAY EQUIPMENT
  ENCLOSED SPRAY GUN CLEANERS

- **OZONE DEPLETING CHEMICALS ELIMINATION**
  SOLVENTS/THINNERS/COATING DILUENTS

VIRGINIA MORRIS
310-942-5913

NORTHROP
B-2 DIVISION

LOW VOC COATING TECHNOLOGY
Implementation Concerns

- **MATERIAL MATURITY**
  - HIGH REJECTION RATE ON INSPECTION TESTS: SCHEDULE IMPACT
  - INSUFFICIENT TIME TO ASSESS LONG-TERM DURABILITY

- **DIMINISHING SUPPLIER BASE - INDUSTRY DOWNTOWN**
  - ECONOMIC IMPACT: REFORMULATION OF SMALL VOLUME MATLS
  - INADEQUATE RESOURCES TO MANAGE ABYSS OF REGULATIONS

- **COMPETING TECHNOLOGY CONCERNS**
  - AIRCRAFT MISSION PERFORMANCE
  - FLIGHT SAFETY TO COMMERCIAL/MILITARY CREW & PASSENGERS
  - 30 YEAR LIFE CYCLE
  - SYSTEM COMPLEXITY

- **COMPETING REQUIREMENTS**

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310-942-5913

LOW VOC COATING TECHNOLOGY

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OVERVIEW OF COATING TECHNOLOGIES

Sharon M. Johnson, Environmental Chemist
North Carolina Office of Waste Reduction

Prior to 1966, when the first U.S. environmental regulation was adopted, almost everything that was painted was being finished with low-solids solventborne coatings. Since that time, environmental concerns and the increasing cost of solvents has created demand for chemical formulations and coating application techniques that will reduce air emissions and save raw materials. This demand increased dramatically with the passage of the 1990 Clean Air Act Amendments.

Typical solvent-based paints contain 60-80% volatile organic compounds (VOCs), many of which are also listed as hazardous air pollutants (HAPs) or toxic air pollutants. There are a number of new resins being introduced into the coatings market aimed at improved performance, especially in high-solids and waterborne formulations. In addition to new coating formulations, technologies are changing rapidly to improve efficiency in coating applications.

The purpose of this paper is to encourage pollution prevention in coating operations by providing information on the advantages and disadvantages of various coating formulations and application technologies. There are many variables involved in choosing the most efficient technology (or combination of technologies), and it is hoped that this information will serve as a guide in making those decisions.

COATING FORMULATIONS

High Solids Coatings: These coatings are solvent-based with a high resin concentration. Solids content typically falls in the 50-70% range although some formulations are higher.

Advantages

- Reduced VOC and HAP emissions
- Reduced solvent usage
- Reduced inventory
- Reduced fire hazards
- Reduced number of spray applications to achieve a given film thickness
- Improved abrasion and mar resistence

Disadvantages

- Generally require high cure temperatures
- More sensitive to inadequate cleaning of substrate
- Extremely sensitive to temperature and humidity
- Film thickness control more difficult

- Tacky overspray more difficult to clean
- May require paint heater in system
- More difficult to control sagging
- Narrow "time-temperature-cure window"
- Cannot use dip or flow coating
- Difficult to repair

Waterborne Coatings: In waterborne coatings water, alone or in conjunction with an organic solvent, acts as the carrying medium. Most waterborne coatings contain an organic cosolvent (usually 2-30%) that is added to dissolve the resin.

Advantages

- Reduced VOC and HAP emissions
- Conventional application processes can be used
- Reduced toxicity and odor, resulting in improved worker safety and comfort
- Good storage life
- Easy cleanup
- Reduced fire hazard
- Minimization or elimination of hazardous waste disposal

Disadvantages

- May cause grain raising in wood
- Tendency to foam
- Rubbing requires greater effort
- Surface must be completely free of oil and dust
- Longer drying times or increased oven temperatures required
- High gloss finish more difficult to obtain
- Cleanup more difficult once coating is cured
- Greater susceptibility to dirt pickup
- Most cost more/gallon on an equivalent solids basis
- Not as many resins available for waterborne formulations
- Converting solventborne coating line may be complex (need stainless steel or plastic lines, valves, etc.)
- Problems with atomization (reduces paint transfer efficiencies)
- Increased runs and sags
- Better temperature and humidity control needed
- Storage area requires enclosure and heating
- Refinishing is more difficult

Powder Coatings: Powder coating uses 100% resin in dry powdered form with a built-in curing agent.

Advantages

- Cost savings due to:
  - -No solvent flash required
  - -No coatings mix room needed
  - -Minimal oven length required
  - -Low ventilation requirement
  - -Floor space economy (2/3 to 3/4 of wet paint systems)
- VOC and HAP compliance (no solvents)
- Quality finish
- Durable finish
- Good corrosion resistance
- Coating utilization efficiencies can reach 95-99 %
- Energy savings
- Little operator expertise required
- Quick "packagebility"
- Variety of resins available
- No hazardous overspray, waste sludge, or contaminated water
- Reduced worker exposure to solvent vapors

Disadvantages

- Heat requirement restricts powder to metal finishing
- Powder manufacturing limitations
  - -Hard to make small amounts
  - -Control of texture size and distribution limited
  - -Metallic powder coatings not as attractive as wet metallic finishes
- Recirculating system creates negative pressure in booth
- Need gentle air stream to apply powder
- Enhanced Faraday cage effect
- Thin films below 1.0 to 1.5 mils are difficult to achieve
- Powder clumping
- Difficult to change colors
- Needs cool, dry storage area
- Powder coatings difficult to match for repair with liquid paint and hard to strip
- Pretreatment of substrate more critical

UNICARB Spray System: The UNICARB system uses super-critical carbon dioxide to replace a substantial amount of the conventional solvents used to spray apply industrial coatings.

Advantages

- High quality finish
- Fewer coating applications needed
- Reduced VOCs and HAPs
- Reduced operating costs
- Easy to retrofit
- High transfer efficiency
- May reduce sanding requirements for wood furniture
- Reduced worker exposure to solvent vapors

Disadvantages

- Limited experience
- Lower fluid delivery rates than airless or air spray guns
- Gun and supply tubing is bulky
- Royalty costs

Radiation cured coatings: Radiation cured coatings (ultraviolet (UV), electron beam (EB) and infrared (IR)) use electromagnetic radiation to alter the physical and chemical properties of a coating such that the organic substrate develops cross-linked or solvent-insoluble network structures.

Advantages

- UV and EB technologies use coatings with lower VOC and HAP content than conventional coatings
- IR ovens oxidize various VOCs thus reducing potential emissions
- Increased production rates due to shorter curing periods
- Low energy costs
- Consistent performance
- Smaller ovens required
- Low air movement reduces dust and dirt contamination
- Easily installed/retrofitted
- Reduced fire and explosion hazard

Disadvantages

- Interference of photocure by pigments

- Higher capital investment than conventional ovens
- Higher coating costs (EB and UV)
- Potential problems with acrylate toxicity
- Shrinkage and adhesion problems with acrylate
- Not applicable to all finish types because it produces a specific "look"
- Dermatitis
- Curing sensitive to shape of part

Two-Component Reactive Liquid Coatings: In a two-component reactive liquid coating system, two low-viscosity liquids are mixed just before entering the application system. One liquid contains reactive resins, and the other contains an activator or catalyst that promotes polymerization of the resins.

Advantages

- Eliminates or reduces solvent
- Low temperature processing

Disadvantages

- Limited experience
- Uncured resin may be harmful
- High process complexity
- High level of operator skill required
- High capital cost
- Limited pot life

Vapor Permeation of Injection-Cured Coatings: A reactive resin is applied as a liquid and then curing is induced by exposing the liquid to a vapor containing a compound that initiates polymerization. One example is polyol-isocycanate coatings cured by tertiary amine vapor injection.

Advantages

- Eliminates or reduces solvent
- Low temperature processing
- Unreacted overspray can be collected for reuse
- Can be used on heat sensitive substrates

Disadvantages

- Limited experience
- High process complexity
- High level of operator skill required
- High capital cost

APPLICATION TECHNOLOGIES

Low-volume High-pressure (conventional) Spray: LVHP spray guns use compressed air from an air compressor to atomize the paint. Pressures typically range from 40 to 70 psi.

Advantages

- Excellent atomization permits high quality finish
- High production rates

Disadvantages

- Extensive overspray
- Increased booth cleanup cost
- Increased filter replacement cost
- Increased waterwash reservoir treatment costs
- High VOC and HAP emissions

High-volume Low-pressure (HVLP): HVLP spray guns use a high volume of air delivered at 10psi or less to atomize the paint.

Advantages

- Reduced overspray
- Increased transfer efficiency
- Reduced paint waste
- Lower booth cleanup costs
- Reduced filter replacement costs
- Decreased waterwash reservoir treatment costs
- Decreased VOC and HAP emissions
- Portable and easy to clean
- Sprays well into recesses and cavities
- Reduced worker exposure to blowback

Disadvantages

- Atomization may not be sufficient for fine finishes
- High production rates may not be possible

Airless Spray: In an airless spray gun the paint is atomized by increasing the paint's fluid pressure (ranges from 500 to 6500 psi) without introducing a pressurized air flow.

Advantages

- High rates of paint flow
- Relatively high transfer efficiency
- Gun handling versatility (no air hose)
- Ability to apply highly viscous fluids

Disadvantages

- Relatively poor atomization
- Expensive nozzles
- Reduced fan pattern control
- Coatings limitation
- Tendency for tip plugging
- Skin injection danger
- Increased operator training required
- Increased maintenance requirement

Air-assisted Airless: An air-assisted airless gun uses from about 150 to 800 psi of fluid pressure and 5 to 30 psi of air pressure to atomize the paint.

Advantages

- Good atomization (not as good as air)
- Varied fluid delivery
- Low bounceback
- High paint transfer efficiency

Disadvantages

- Skin injection danger
- Increased maintenance required
- Increased operator training required
- Cost

Electrostatic Spray: With an electrostatic spray gun, the atomized paint droplets are charged at the tip of the gun by a charged electrode. The part to be painted is electrically neutral and the charged paint droplets are attracted to the part.

Advantages

- High transfer efficiency
- Good edge cover
- Good wraparound
- Uniform film thickness

Disadvantages

- Guns tend to be bulky and delicate
- Extra cleanliness essential
- Faraday cage effect
- Safety/fire hazard
- Parts must be conductive
- High equipment and maintenance cost

Rotary Atomizers: Instead of air or fluid pressure, rotary atomizers use centrifugal force to atomize the paint and electrostatic charging to attract the paint to the part.

Advantages

- Excellent atomization
- High solids, waterborne versatility
- Viscosity flexibility
- High transfer efficiency

Disadvantages

- Extra cleanliness essential
- Faraday cage effect
- Safety/fire hazard
- Parts must be conductive

Roll coating: With roll coating the paint is applied by one or more auxiliary rolls onto an application roll, which rolls across the conveyed flat part.

Advantages

- High transfer efficiency
- High production rates

Disadvantages

- Cannot get hard-to-reach areas
- Limited to flat work

Dip Coating: Parts are painted by dipping (usually by conveyor) into a tank of the paint.

Advantages

- High production rates
- Low labor requirements
- High transfer efficiency

Disadvantages

- Extremely dependent on viscosity of the paint
- Not suitable for hollow-shaped items
- Color change slow
- Fire hazard
- Poor to fair appearance

Flow coating: In a flow coat system 10 to 80 separate streams of paint are directed to coat all surfaces of the parts as they are carried through the flow coater on a conveyor.

Advantages

- High transfer efficiency
- Low installation cost
- Requires little maintenance
- High production rates
- Low labor requirement

Disadvantages

- Poor to fair appearance
- Principal control of dry-film thickness is viscosity of paint

Curtain coating: In curtain coating, a waterfall-like flow of paint coats a horizontally conveyed part. The paint flows at a controlled rate from a reservoir through a wide variable slot.

Advantages

- High transfer efficiency
- Uniform coating thicknesses possible

Disadvantages

- Suitable only for flat work
- Highly viscosity dependent

Electrocoating: Electrical deposition of a paint film from a waterborne organic solution onto a part.

Advantages

- Over 90% utilization of coating material
- Very thin, uniform coating on all surfaces that can be reached by electricity
- High production rates
- Corrosion resistant coating
- Low VOC and HAP emissions
- Process can be fully automated
- Can apply second coat on uncured electrocoat

Disadvantages

- Substrate limitation
- Separate lines needed for each color
- High cost to install
- Masking problems
- Sophisticated maintenance requirements
- Air-entrapment pockets
- Bulk small-part coating difficult
- Corrosion-resistant equipment required
- Deionized water required
- Sanding/stripping difficult
- High energy demands
- Restricted to large volume finishing
- Coating thickness limitation
- High level of training needed for employees

Autodeposition: An oxidation-reduction precipitation process used to deposit organic paint films onto iron, steel, zinc and zinc alloy plated substrates.

Advantages

- Excellent anticorrosion properties (no phosphate coating required)
- 100% coverage of surfaces wetted (no Faraday cage areas)
- Uses waterborne material
- No external source of electricity

Disadvantages

- Dull or low-gloss appearance
- Few colors available

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1. Industrial Painting Principles and Practices, Norman R. Roobol, Hitchcock Publishing Co., 1991.

2. "Technical Reference Manual on Techniques for Reducing or Eliminating Releases of Toxic Chemicals in Metal Painting" to the U.S. Environmental Protection Agency, Battelle.

3. "Guide to Clean Technology, Organic Coating Replacements", U.S. EPA, May 15, 1992.

4. "Metal Finishing by Autodeposition of Organic Coatings", Oscar E. Roberto, Robert G. Hart, and Thomas C. Jones, Parker+Amchem Henkel Corporation.

5. UNICARB Update, "Gunning for the Future, Nordson Sharpens its Aim With UNICARB System", Spring 1991.

SESSION SUMMARY

SESSION NAME: FY 94 Grant Guidance

FACILITATOR(S) NAME: Tom McCully
Lena Hann

DAY AND TIME OF SESSION: Wednesday, 3:30 - 5:00

APPROXIMATE NUMBER OF PARTICIPANTS: 60

OBJECTIVE OF SESSION:

Update on EPA FY 94 media grant guidance with concrete examples of implementation.

KEY POINTS MADE BY SPEAKERS AND PARTICIPANTS:

1. P2 has been incorporated in EPA FY 94 grant guidance.
2. P2 implementation is dependent on:
   a. EPA and state top management support.
   b. Flexibility, required to implement P2 into media grants.
   c. EPA and states being prepared for barriers and investments/disinvestments.

RECOMMENDATIONS FOR FURTHER DISCUSSION/ACTION:

1. Issues needed much more discussion. When more examples become available, this would be the next logical step.
2. This issue involves participation from sometimes competing interests - regulating personnel and issues versus technical assistance. Since funding is the basis for implementation, some interests are concerned about their role.

FOLLOW-THROUGH, INCLUDING CONTACT NAMES AND PHONE NUMBERS FROM PARTICIPANTS WHO COMMIT TO WORKING ON THIS ISSUE, AND ANY MILESTONES WITH APPROXIMATE TIMELINES:

Timelines - Fall, 1994 - Development of FY 94 implementation examples.

SESSION SUMMARY

SESSION NAME: Program Updates

FACILITATOR(S) NAME: Kevin Dick, Manager
Business Environmental Program
Nevada Small Business Development Center

DAY AND TIME OF SESSION: Wednesday, April 28, 1:30-3:00

APPROXIMATE NUMBER OF PARTICIPANTS: 65

OBJECTIVE OF SESSION:

Provide information about some of the activities and program elements of various state pollution prevention programs.

KEY POINTS MADE BY SPEAKERS AND PARTICIPANTS:

The Roundtable has avoided being prescriptive regarding what elements state pollution prevention programs should include. Different states have different needs and different program structures. Presentations in this session are not intended to endorse particular programs or program elements. Attenders should consider which elements might be useful to include in their programs. Other states may have unique program approaches, so networking at the Roundtable is encouraged so that more can be learned about these other states. The presentations represent overviews of program elements. Many of these elements are addressed further in other conference breakout sessions.

One approach to consider, and which is becoming more common, is to use vehicles outside of regulatory agencies to deliver pollution prevention information and assistance. Nevada has chosen to utilize the state network of Small Business Development Centers. The program has been implemented quite efficiently by utilizing the existing business assistance infrastructure available through the centers. Nationwide, a network of 750 centers exist which might be considered by state programs as an existing assistance vehicle. Other states are also utilizing other types of industrial or agricultural extension programs in order to provide pollution prevention assistance.

<u>California:</u>

Presenter:
Kim Wilhelm, Supervising Waste Management Engineer
California Department of Toxic Substances
Office of Pollution Prevention and Technology Development
(916) 322-3670

Kim recommended developing a business plan early on in implementation of pollution prevention programs to make sure the product is needed, well marketed, and produced measurable results. Recently, DTSC had gone through an exercise of identifying clients which included local governments, state governments, and businesses and industry.

Although California has a large P2 staff, their per capita ratio is probably smaller than many states. California views local governments as particularly important in developing an effective pollution prevention program. Grants are being provided to support local government programs.

Several local governments are pursuing public/private partnership approaches. San Diego County is working with their economic development agency in order to deliver the pollution prevention message. Santa Clara County is working with the electronics industry on a local green-start type computer project. The State is involved with a coalition of local governments in the Bay Area.

Targeted Opportunities for Pollution Prevention in Stockton (TOPS) is a geographically targeted initiative which involves demonstrating that local communities can implement pollution prevention programs. TOPS includes promotion by City and County governments through such vehicles as CEO breakfasts, commercials, and seminars.

Local governments do much of the inspection and enforcement of generators in the state. Kim pointed out that it's necessary to establish compliance in order to demonstrate the cost-effectiveness of pollution prevention. Regional Pollution Prevention Roundtables of local programs meet regularly in California, and the State is working to establish a budget and authorization through their contracts with local governments in order to encourage attendance at these meetings.

DTSC is pursuing pollution prevention through permit conditions and settlement agreements. Information about California's pollution prevention initiatives can be found in the Sixth Biennial Report on Pollution Prevention, which was available as a handout at the conference.

A recent initiative is the Incinerable Waste Project, which was developed based on an incinerator capacity shortfall identified in the state CAP, and which targets the top 50 incinerable waste generators, for a 50% reduction in these wastes from 1987 to 1992.

Several Solvent Substitute Expositions (modelled after the Massachusetts Solvent Bazaar) will be held at community colleges, at which businesses can bring their soiled parts and try out various cleaning options. Regulatory agency personnel will be on hand to discuss implementation issues and national lab personnel will provide technical assistance.

DTSC has been responsible for developing a number of manuals, reports, and fact sheets, addressing opportunities for pollution prevention in various businesses and processes.

Session Name - Program Updates

DTSC is currently establishing a program which will allow business people to work at DTSC in order to become better educated about P2 and who can then return to their company and champion P2.

DTSC is also working more closely with the Department of Commerce in order to provide a non-regulatory vehicle to work with businesses on pollution prevention.

Minnesota:

Presenter:
Cindy McComas, Director
Minnesota Technical Assistance Program (MNTAP)
University of Minnesota
(612) 727-3260

MNTAP was established in 1984 and is located at the University of Minnesota. Since 1985, the staff has grown from 2 to 16 FTE, and the budget has grown to $800,000. MNTAP is organized into a Waste Management Team, a Pollution Prevention Team, and a communication staff. Services include phone assistance, on-site assessments, student interns preparing case studies, publications, and an information clearinghouse.

The program has targeted process based on their use of 33/50 chemicals, which includes vapor degreasing, machining, rinsing and plating, and wood finishing. In addition to these, the program is also focusing on commercial food preparation. Minnesota has developed a stat program based on the 33/50 concept called the Minnesota 50.

Program effectiveness is measured based on the number of calls received, the type of calls, and through follow-up surveys.

Site assessment measures can include the number, the type of business, case studies developed, and waste reduction achieved. Actual and projected waste reduction quantities are also compared.

The Minnesota Toxic Pollution Prevention Act provides stable funding for the program. The Act requires pollution prevention facility planning, progress reporting, requires MNTAP to provide technical assistance, and provides for a Governor's Award.

MNTAP is involved with organizing P2 conferences, promoting P2 and developing policies, implementing the Minnesota 50 project, working with the legislature, providing presentations at associations, and in the Governor's Pollution Prevention Award for state agencies.

Session Name - Program Updates

Massachusetts:

Presenter:

Paul Richard, Toxic Use Reduction Specialist
Massachusetts Office of Technical Assistance
(617) 727-3260

In 1988, the Central Massachusetts Pollution Prevention Project, which focused on metal working, was begun. From this, the Blackstone Project was developed, which provided multi-media inspections. The findings from this project included: cross-media transfers were prevented, agency coordination was improved, pollution prevention activities were increased, and toxics reduction was reported from the targeted group.

The Toxic Use Reduction Act (TURA) was enacted in 1989. This Act included responsibilities for three different agencies, the Department of Environmental Protection (DEP), the Toxic Use Reduction Institute (TURI), established at the University of Massachusetts at Lowell, and the Office of Technical Assistance (OTA).

DEP's responsibilities included: implementing an expanded Blackstone project statewide, developing a pilot pollution prevention permitting program, increasing agency coordination, including cross-media training, identifying regulatory barriers, developing a pollution prevention enforcement policy, developing certification requirements for facility planners, and developing a state-wide TRI type database to track toxic use reduction. DEP has found that the regulatory agency personnel can effectively deliver the pollution prevention message by promoting P2 when businesses seek advice on how to comply with regulations.

TURI's responsibilities under TURA include: developing a curriculum for toxic use reduction planning, organizing conferences, developing planning guidance, providing training workshops, developing a library and P2 informational materials, developing a parts cleaning laboratory, and providing incentive grants for P2 projects.

OTA's responsibilities include: expanding their technical assistance services, publishing case studies and technical papers, developing practical guides to pollution prevention, conducting demonstration projects (which are focusing on plating and painting), providing workshops, working on financial and legislative programs in order to promote toxic use reduction, and providing planning for toxic use reduction program development.

New Jersey:

Presenter:

Kevin Gashlin, Director
New Jersey Technical Assistance Program for Industrial Pollution Prevention
(210) 596-5864

Session Name - Program Updates

New Jersey is involved in public/private partnerships in an effort to maximize the effectiveness of their limited resources. They're involved in a joint project with EPRI and the NJ power to promote waste reduction and energy efficiency.

In cooperative efforts with POTWs, their program is targeting electroplaters and sources of VOCs for pollution prevention assistance. The program offers advice and assistance. The state cannot fund pollution prevention projects, but one mechanism being used to promote pollution prevention is enforcement actions.

A contract has been established with Burlington County to develop an alternative collection program for CESQGs, and to work with these businesses on solvent replacement projects.

An environmental education curriculum is being developed in New Jersey, which will be integrated into vocational curriculums offered through the public school systems. Curriculums will address printing and collision repair. New Jersey hopes to have the curriculums, which are being developed for these pilot projects, available to distribute to the Roundtable membership by the end of the year.

NO RECOMMENDATIONS FOR FURTHER DISCUSSION/ACTION

SESSION SUMMARY

SESSION NAME: Solvents Alternatives

FACILITATOR(S) NAME: Vic Young

DAY AND TIME OF SESSION: Wednesday, April 28, 3:30 - 5:00

APPROXIMATE NUMBER OF PARTICIPANTS: estimated in excess of 50 people

OBJECTIVE OF SESSION:

The necessity for phasing out the chlorinated solvents was discussed relative to the impacts on the environment.

KEY POINTS MADE BY SPEAKERS AND PARTICIPANTS:

Speakers:

Ken Monroe, RTI, (919) 541-6916
Chuck Darvin, EPA, (919) 541-7633
David Williams, NCOWR, (919) 571-4100

The Solvents Alternatives Guide (Sage) computer software program was discussed and demonstrated by Ken Monroe and Chuck Darvin. This Electronic Handbook gives recommendations for alternate solvents, in response to a series of questions answered by the user. The possible recommendations include the latest in technology, such as carbon dioxide pellets and laser ablation, as well as the standard alkaline and acidic solutions.

Audience participation focused on the desire for new universal solvents. Since they are not available, the interest in the Sage software is renewed. Copies of the software are available by contacting Ken Monroe or Chuck Darvin.

David Williams discussed several case studies in North Carolina where major firms have received recognitions from the Governor's office for eliminating the use of TCA 1,1,1.

RESEARCH TRIANGLE INSTITUTE

RTI

Center for Aerosol Technology

SAGE

Solvent Alternatives Guide

What it is: An electronic handbook designed for use by: shop owners; state technical assistance offices; anyone with questions about solvent substitution for metal degreasing and cleaning. It is designed to work on a PC-AT or better.

How it works: Just answer questions about the material or part that you want to clean e.g. material, shape, size, coatings, soils, cleanliness requirements, current equipment, etc.

Possible Recommendations:

Low Pressure Spray	Plasma Cleaning	Semi-aqueous Cleaning
High Pressure Spray	Laser Ablation	Alcohols
Power Washers	UV/Ozone	Acetone
Immersion Cleaning	Super Critical Fluids	NMP
Ultrasonics	Megasonics	Terpenes
Brushing	Xenon Flash Lamp	Dibasic Esters (DBE)
Wiping	Pure Water	Glycol Ether
Abrasives	Neutral Aqueous Solutions	Petroleum Distillates
Steam	Alkaline Aqueous Solutions	Sequestering Agents
CO_2 Snow	Acidic Aqueous Solutions	Inhibitors
CO_2 Pellets	Lactate Ester	Surfactants
Builders	Chelating Agents	Emulsifying Agents

Availability: February 1993

Who to call:

U.S. EPA
Control Technology Center
Hot Line: 919-541-0800
BBS: 919-541-5742 (9600-N-8-1)

Chuck Darvin 919-541-7633
Air and Energy Engineering Research Lab (AEERL)
U.S. EPA
RTP, N.C. 27709

Ken Monroe 919-541-6916
Research Triangle Institute
RTP, N.C. 27709

Post Office Box 12194 Research Triangle Park, North Carolina 27709-2194
Telephone: 919 541-6736 FAX: 919 541-6936

BENEFITS RESULTING FROM NEW AQUEOUS SYSTEM

- SINCE ELIMINATING FREON, HIGH EMISSION LEVELS OF CHLORINATED SOLVENTS ARE NO LONGER A CONCERN
- ANNUAL CHEMICAL PURCHASES WENT FROM $120,000 IN SOLVENTS TO APPROX. $18,000 IN AQUEOUS SYSTEM
- SOLVENT SYSTEM UTILIZED 5 OPERATORS, AQUEOUS SYSTEM ONLY 2 OPERATORS
- DUE TO EXTENSIVE FILTRAION AND OIL REMOVAL, WASTE DISPOSAL COST DROPPED SINCE AQUEOUS CHEMISTRY IS EASILY HANDLED IN WASTE TREATMENT SYSTEM.
- SYSTEM IS PERSONNEL AND ENVIORNMENTALLY FRIENDLY
- APPROXIMATE ANNUAL SAVINGS $180,000

TIME FRAME AND CAPITAL EXPENDITURE

- SOIL SAMPLES AND PARTS CLEANING EVALUATION IN JULY 1990
- PROCESS QUALIFIED BY CUSTOMER SEPTEMBER 1990
- PRELIMINARY ENGINEERING OF EQUIPMENT:
  QUOTATION NOVEMBER 1990
- CUSTOMER EVALUATION IN BUDGETING UNTIL LATE 1991
- ORDER PLACED IN NOVEMBER OF 1991 FOR APPROXIMATELY $320,000
- SYSTEM DELIVERY IN MARCH OF 1992, AND FULLY OPERATIONAL IN TWO WEEKS

TIME TABLE

- COMMERCIAL LIFETIME LESS THAN FOUR YEARS
- EXCISE TAXES AND COSTS ARE INCREASING
- ALL HALOGENATED SOLVENTS UNDER ATTACK
- AROMATIC HYDROCARBONS UNDER ATTACK
- TIME TO TEST AND MAKE CHANGES IS NOW

MAJOR CHALLENGE

- MANDATED PHASEOUTS AND INCREASINGLY STRICTER LIMITS ON ALL SOLVENTS HAS CREATED A MAJOR CHALLENGE

- MANUFACTURER NEEDS
  1. MAINTAIN PRODUCTIVITY
  2. PRODUCTION QUALITY
  3. PROTECT ENVIRONMENT
  4. PROTECT EMPLOYEES
  5. COMPLY GOVERNMENT REGULATIONS

ADVANTAGES OF AQUEOUS CLEANING SYSTEMS

- AQUEOUS CLEANING SYSTEMS IMPROVE CLEANING QUALITY REMOVING INORGANIC AND ORGANIC SOILS FROM PARTS
- BIODEGRADABLE DETERGENTS THAT POSE NO HEALTH OR ENVIRONMENTAL CONCERNS CAN OFTEN BE USED
- EXPENSE FOR AQUEOUS SOLUTIONS ARE CONSIDERABLY LOWER THAN THAT OF SOLVENTS
- DISPOSAL OF AQUEOUS DETERGENTS IS USUALLY EASILY HANDLED
- PROCESS SPEED CAN INCREASE WITH THE USE OF AUTOMATION

FOUR BASIC TYPES OF CLEANERS

THERE ARE FOUR BASIC TYPES OF PRODUCTS THAT CAN REPLACE CHLORINATED, CFC, AND AROMATIC SOLVENTS WHILE MEETING STRINGENT EMISSIONS, HEALTH, SAFETY, AND CLEANING PERFORMANCE.

THEY ARE:

1. WATER BASED
2. WATER DILUTABLE
3. WATER INSOLUBLE
4. SYNTHETIC HYDROCARBONS

CHALLENGES FOR THE FUTURE

NATIONAL POLLUTION PREVENTION ROUNDTABLE

SAN DIEGO, CALIFORNIA
APRIL 28, 1993

BY
JOHN WISE
ACTING REGIONAL ADMINISTRATOR
EPA REGION 9

I am honored to be invited to share my perspectives at this National Roundtable. It is gratifying for me to be among so many colleagues and friends tonight; for you - individually and collectively - have done so much to advance the concept of pollution prevention and to build viable programs at the state and local level.

These are exciting times ... times of change. Yet, despite the campaign rhetoric or the Clinton Administration, this "change" is not entirely new. Over the past several years, we have been witnessing and participating in a "sea change" ... a change that is trending towards a vision of environmentally responsible economic development.

In my remarks tonight, I want to examine the origins of this change; the forces and influences that are shaping and defining our journey and the challenges for the future.

A good place to start is to examine EPA's statutory mission as the defining framework for the changes that are taking place.

Today, EPA administers some 14 different statutes, each of which requires some form of pollution control and abatement. The distinguishing feature of each of these individual statutes is that they are single-purpose, media-specific, and they mandate the "control" and "abatement" of pollution. That is, all of our federal statutes mandate a regulatory/enforcement structure to control pollution releases. This has come to be known as "command and control", that is we "command" by regulation, and "control" by permits and enforcement.

Therefore, from our statutes, we can distill EPA's primary mission:

- set national standards
- promulgate regulations
- issue permits
- inspect for compliance
- enforce where necessary
- monitor for environmental result

And, of course, all of this is done in concert with the states, regional agencies, and local governments under a series of "delegation agreements" -such that "command and control" cascades down through the different levels of government.

Over the years, environmental regulation by "command and control" has produced remarkable results:

- major reduction of mass loadings of pollutants to air, water, and land;
- installed control technology (end-of-pipe, top-of-stack;
- provided essential public health protections;
- arrested ecosystem losses.

All of this has cost society roughly $1 trillion in the past 20 years. The <u>costs</u> of controlling pollution now account for roughly two percent of U.S. Gross National Product. America is now spending about $115 billion a year to meet environmental goals. The <u>benefits</u>, although not

precisely quantifiable, are the reasonably clean and healthful environment that we generally enjoy today.

America could well afford an investment of this magnitude.

We have much to be proud of.

But - when we examine our progress and the prospects for the future we can see some disconcerting trends:

1. Despite all of our gains, we are barely keeping up with growth;
2. While we made reductions in one media, we may have simply transferred the problem to another media;
3. While we are imposing regulatory costs on U.S. industry, our global competitors are gaining an unearned trade advantage.

Moreover, the environmental landscape is changing. We find that the remaining environmental problems/risks:

1. reside in a large universe of small sources;
2. require a geographic or location-specific response;
3. require a change in corporate and consumer behavior.

These features of the changing environmental landscape indicate that our traditional "command and control" regulations (mandated by statute) may not be very effective, and certainly can't be very efficient, in addressing these remaining environmental problems.

As America faces the economic realities of the 1990's, wherein we must compete in a worldwide marketplace, we cannot afford to continue to operate an inefficient environmental regulatory scheme. Over the past four-to-five years, we have seen EPA, the states, and industry all make fundamental shifts to restructure our programs for a new future - all based loosely upon the concept of pollution prevention.

What motivated these changes?

For EPA and the states, pollution prevention was initially seen as an extension of our regulatory programs. Indeed, most of the early prevention-based activity was driven by our regulatory and enforcement authorities and by the imposed costs and liabilities that attend our enforcement efforts. We used our regulatory and enforcement authorities to directly gain pollution prevention as conditions of a permit, or as terms of an enforcement settlement.

For industry, it was apparent that imposed regulatory costs - costs of permit applications, cost of end-of-pipe treatment, cost of disposal, cost of compliance, cost of non-compliance by fines

and penalties, cost of liabilities, cost of insurance - were viewed as non-productive expenses. Cost minimization and cost avoidance naturally led many industries to waste minimization programs, recycling and recovery operations, and better housekeeping; the first tentative steps towards pollution prevention...

However, I suggest that, behind the cost calculus, three other interrelated forces intersected to drive a fundamental restructuring of industrial operations towards pollution prevention:

1. the appreciation for global competitiveness and sustainable growth;
2. the public disclosure requirements of community right-to-know laws;
3. the onset of total quality management.

In the mid-1980's, many companies began to congratulate themselves for what they thought was a remarkable feat - compliance with government regulations! Today, it is not enough to simply comply with governmental regulations; a progressive company is moving "beyond compliance", and ahead of its industry in a fast-paced global economy.

What accounts for this dramatic shift in perspectives? Basically, American managers are realizing that they cannot remain fixed on a short-term preoccupation with compliance and costs. They are developing a new sense of a far greater value, that is, the concept of sustainable growth, wherein enlightened environmental management reinforces economic growth wherein long-term values of sustainability outweigh short-term costs.

This "refocusing" effort, already well underway in the mid-1980's, was given powerful impetus by the disclosure requirements of Community Right to Know Laws, such as SARA (Title III) and, in California, Proposition 65. These disclosure provisions, such as the Toxic Release Inventory, are reshaping environmental policy.

Information is power, and when citizens have information about the release of toxic substances to the air, water, or land, they demand action. The toxic release inventory has done more to reduce toxic emissions than all of our regulations taken together - simply by turning the glare of adverse publicity (and attendant liability) on companies that are releasing these chemicals. We have seen dramatic reductions (all voluntary) in chemicals released, in a frantic scramble by business to restore public confidence and corporate image.

(Despite the good news embodied in these trends, let me also issue a caution. The corporate rush to reduce releases of high volume chemicals may inadvertently bias the need to first address the releases of chemicals which pose the most serious risks. TRI deals with releases, not exposures and consequent risk to public health. Companies will need to be mindful of the necessary balance between total reductions and reductions of those chemicals that may jeopardize public health.)

John Wise, "Challenges for the Future"

At the beginning of the TRI in 1987, most companies were focused on compliance and they simply did not know what they were releasing to the environment by pathways that were not directly regulated. The numbers were astonishing and caught most corporate managers and their environmental management staff totally by surprise.

The prevailing corporate fear of public disclosure - a hostile public, angry neighbors, boycotting consumers, NIMBY - did not come to pass. The world did not end. Disclosure actually helped many companies deal with their external constituencies and neighbors.

But the real payoff came inside the company. Companies invested in internal auditing, mass balance inventorying, life-cycle costing, all of the internal techniques that provided the data necessary for accurate reporting and honest public disclosure of environmental releases. By disciplining the data collection effort and husbanding information, companies were able (for the first time!) to see how their basic production processes were leading to the generation of wastes and to economic inefficiencies.

The need for data enabled the environmental managers to work with the production managers to ask some fundamental questions: How can we minimize waste? How can we prevent pollution? How can we change inputs, change processes? How can we produce green products in a green way?

This data-driven self-examination of performance is (as you know) a fundamental quality process. As total quality management drives the production process toward prevention-based operations, companies are reassessing their role: the ultimate purpose of the corporate endeavor is to compete in a global economy, not to passively comply with rules and regulations.

And, in order to compete, American companies will need to retool for clean production technologies:

a. where prevention changes the cost profile;
b. where information from environmental managers and production managers merge to form a new direction for the company;
c. where new total quality principles of continuous improvement and process reform drive us to achieve our environmental and economic goals.

We have seen that total quality management, where process information drives prevention-based behavior, can result in significant payoffs:

1. reduction or elimination of a waste;
2. conservation of materials, conservation of water;
3. energy efficiency;
4. technical accomplishment;
5. financial benefit;

6. sharpening the competitive edge of American industry;
7. the ultimate benefit - removing the company entirely from regulatory jurisdiction:

   - no more permit applications;
   - no more inspections;
   - no more reporting;
   - no more treatment and disposal costs;
   - no more enforcement fines and penalties;
   - no more liabilities;
   - no more excuses!

We have certainly witnessed a dramatic change in EPA, in the states, and in the business community in the way we seek to accomplish our environmental goals.

- EPA is shifting from regulator to cooperator.
- Industry is shifting from compliance to competitiveness.

We have made much progress, but our journey has just begun. As we look toward the future, from the platform of accomplishment to date, we face four major challenges.

These challenges are:

1. To articulate prevention-based behavior as a prevailing social/cultural ethic.

2. To diffuse that ethic to a larger community:

   - within EPA itself;
   - externally with our state and local partners;
   - vertically down through the business establishment;
   - horizontally across all sectors of U.S. enterprise.

3. To promote clean and green technology to retool America for the global marketplace; and

4. To promote total quality and continuous improvement by measuring progress and celebrating success.

Let me examine each of these challenges in turn.

1. To articulate prevention-based behavior as a prevailing social/cultural ethic:

We need to recognize that pollution prevention is not just another activity, not just another initiative, not just another program that is layered on top of everything else we do.

John Wise, "Challenges for the Future"

Pollution prevention is a fundamental new philosophy which needs to be incorporated as an integral and central component of all environmental policy; all economic and industrial activity; all consumer behavior. We need to appreciate that pollution prevention requires a new cultural orientation - we need to reach deeply into the culture and values of society and create a fundamental new philosophy, or ethic.

This new ethic will be the underlying integrating force - the essential linchpin - to unify environmental and economic policy for long-term sustainability.

2. <u>To diffuse this prevention-based ethic to a larger community.</u>

This diffusion effort must begin with EPA itself. If we are to make pollution prevention the strategy of preferred choice in the Agency, we must incorporate prevention into our ongoing regulatory and program agenda - to mainstream prevention into the core values of the Agency.

The diffusion effort must naturally extend externally to our state and local partners, where so much initiative and progress have already been made in developing pollution prevention as the centerpiece of state programs. We need to continue to develop a network of EPA/state collaboration.

I suggest that it is time to systematically integrate federal grant assistance and state resources invested in pollution prevention. We have gained much from the various EPA grant programs, PPIS, two percent set-asides, and media program grants, but we must now construct a larger framework (or strategy) for our unified efforts.

The State Grants Guidance, issued November 12, 1992, by former Deputy Administrator Habicht, is the perfect vehicle to systematically integrate our efforts. I encourage maximum utilization of the opportunities for flexibility that the Guidance provides.

The diffusion effort must be vertically implemented. That is, major large corporations are already well along the prevention-based transition; we must devote increasing attention to medium, and small, businesses. These smaller enterprises are caught in the regulatory "web", without the technical, managerial, or financial ability to comply. Assisting these firms to engage in pollution prevention investments, rather than end-of-the-pipe, will enhance their economic productivity and competitiveness, as well as their compliance needs.

The diffusion efforts must be horizontally implemented. That is, our major focus to date has been on manufacturing industry. We need to expand our efforts to address pollution prevention needs in the agricultural sector, the transportation sector, the energy sector, the consumer sector, and most importantly, the federal sector.

All of these efforts at diffusion, inside EPA, with the states, vertically down to medium and smaller businesses, and horizontally across all economic sectors, represents a truly heroic challenge.

3. <u>To promote clean and green technology to retool America for the global marketplace.</u>

As we engage new principles of continuous improvement and process reform to drive us to our environmental and economic goals, we must surmount a formidable challenge. It is no less than "retooling America" for clean production technology.

The Europeans and Japanese have been relatively successful in developing and deploying clean production technologies as part of their national industrial policies. While some of this has occurred in larger U.S. companies (often learned from their European subsidiaries), America seems to be stuck in "technology gridlock".

What accounts for this? Is it attributable to:

- lack of information for prevention-based technologies,
- lack of credit and financing,
- lack of entrepreneurialship and risk takers,
- lack of positive market signals,
- lack of research and development,
- lack of technology transfer programs,
- lack of a national industrial policy?

Or, is it attributable to the BACT syndrome, wherein federal environmental law mandates and enforces "best" available control technology, and so "locks in" the technical specifications. Why go beyond the "best" if there is no incentive or credit to do better? Why go beyond the "best" if it may risk your compliance position vis-a-vis government regulators? Why go beyond the "best" if you have just expended substantive resources on an end-of-the-pipe treatment plant?

Perhaps it is all of the above. If these are root causes of America's technology gridlock, we must systematically address each of them to enable a transition to a clean production industrial base which can effectively compete in the global marketplace. The electronics industry may be a good case study of developing advanced clean production technologies that enable them to successfully compete, domestically and internationally.

Partnerships and collaboration in research, development, and demonstration are very important factors here. I am encouraged as we mobilize the Department of Energy's National Laboratories to help in this endeavor.

Another aspect of green technologies is the export market potential for such technologies themselves. After the Rio Earth Summit, it seems that the "race for green technology" in the global marketplace may be the equivalent of the space race. It is a race that the United States cannot afford to lose, but today, it is a race that we are not even prepared to enter.

4. **To promote total quality and continuous improvement by measuring progress and celebrating success.**

Pollution prevention, like other large-scale social/economic change processes, depends on the validation of incremental successes. Moreover, pollution prevention programs are driven and sustained by information. We need to keep track of progress as prevention-based programs proliferate across the country, document real achievements, share our successes, and build public support and credibility. We need to show measurable environmental, economic, health, and safety benefits from our pollution prevention endeavors.

The transition of America toward a prevention-based ethic and a clean technology industrial base will not occur overnight. Setting high goals, striving for continuous improvement, and celebrating our successes should enlighten our path to the future.

In summary, I've taken you on a long journey: from the origins of our command and control system to the tremendous success in reducing gross mass loadings, to the development of pollution prevention concepts and programs within EPA and the states, to the extraordinary response of industry to Community Right-to-Know laws, to the four challenges of the future -

- to instill a prevention-based ethic,
- to facilitate a diffusion of that ethic to a larger community,
- to promote green technologies, and
- to measure our progress and celebrate successes.

I want to thank you for your patience to indulge me as I scoped-out my perspectives. I would be pleased to respond to questions or comments.

Thank you.

PLENARY SESSION SUMMARY

SESSION NAME: Connecting For Enhanced Coordination Between Agencies and Associations

MODERATOR(S) NAME: Gerald Kotas
David Thomas

NAMES OF SPEAKER: Eleanor J. Lewis

DAY AND TIME OF SESSION: Thursday, April 29, 8:30 - 10:00 A.M.

COMMENTS OF ELEANOR J. LEWIS, DIRECTOR, GOVERNMENT PURCHASING PROJECT, WASHINGTON, DC, APRIL 29, 8:30 - 10:00 A.M.

Ladies and Gentlemen:

I am very happy to be here talking with you. I am particularly happy about this because last year I tried to address your conference, but was unsuccessful. Thus, I was very happy to be invited to speak this year.

The Government Purchasing Project was founded by Ralph Nader and is funded by him and some foundation grants we receive. We do not accept corporate or government funds.

We are advocates for environmentally responsible procurement by Federal, state and local government agencies. Government procurement constitutes about 20 percent of the Gross National Product. We believe government agencies should be intelligent and responsible consumers using their purchasing power to leverage new technologies and to protect the environment.

We have two publications. One is *Forty Ways To Make Government Purchasing Green.* Each registrant at this conference should have received a copy of *Forty Ways* in the registration package. It contains forty specific suggestions for government agencies to follow to reduce solid waste, use energy efficiently and prevent pollution. There are success stories from government agencies across the country for each suggestion and information on where to obtain additional information, guides and other materials.

Energy Ideas is a monthly newsletter focusing on energy-efficient building technologies. It is free to government employees and costs $25.00 per year for a subscription.

I believe that you are very important in our efforts to make government agencies responsible consumers. You have the knowledge necessary to understand why changes are needed, and you are working inside the organizations that we want to change.

Eleanor J. Lewis - "Connecting for Enhanced Coordination"

I urge you to make your employer your client. Look at the government agency that employs you and think about how they can change their purchasing and operating procedures to reduce solid waste, prevent pollution and use less energy. Also, look at all the sister agencies of your employer and think about how they could change. Thus, if you work for the state, apply this principal to all state agencies.

I believe it would be very good for someone from your unit to work with the purchasing division, educating them about these issues. Some states ave someone from the state energy office working with the purchasing division to help increase the procurement of energy efficient products. I think the same result would occur if someone with your training worked with purchasing personnel.

I also urge you to share the information you have, so the wheel does not have to be reinvented in every government agency across the country. Once you have a solution to a problem, spread the work using every available technology - print, electronic bulletin boards, e-mail and anything else you can think of.

Sometimes I think the wheel is being repeatedly invented. For instance, the U.S. Department of agriculture uses soy-based inks for all its printing and the results are outstanding. After the Agriculture Department reported on its experience at the monthly meeting of all Federal agency printers in Washington, the Labor Department printer stated they were studying the use of these inks for their printing. It took all my self-control not to ask "What are you studying and why?" After all, the two departments are located within a mile of each other and they use the same Government Printing Office machines, paper and contractors. There is nothing that distinguishes the routine printing needs of the Labor Department from the Agricultural Department or any other department, for that matter. Once one federal department has obtained a positive result, why would all the others have to study it? What is there to study? A routine government report is a government report regardless of which agency issues it. The paper and printing needs are identical.

There are many success stories waiting to be implemented, not studied. For instance, every state and many local governments have a printing office. Printing facilities have many opportunities to improve their operations and reduce pollution and solid waste. First, there is the issue of using recycled paper with post-consumer paper not rebleached with chlorine. It can either be unbleached or rebleached with oxygen, ozone or hydrogen peroxide. By using vegetable-based inks, print shops reduce their emission of VOCs and facilitate the recycling of the printed page. when these inks are used, the printing presses do not have to be cleaned daily and when they are cleaned, less toxic solvents can be used successfully. Using water-soluble adhesives increases the recyclability of a publication. Also, an efficient, dual-sided layout can do much to reduce the total amount of paper used.

Maintenance shops for motor vehicles are another success story waiting to be implemented. The Canadian House of Commons stopped using detergents when washing cars and found them to be just as clean after a water-only wash. All fluids coming out of the vehicle should be

recycled. Many states are buying recapped tires for their vehicles. One army base found they could clean machinery using water sprayed under high pressure, eliminating the use of very toxic solvents.

Environmentally responsible cleaning and laundry supplies are another success tory waiting to be used. at a lodge in Grand Teton National Park, some consultants changed all the cleaning procedures and products, saving money and time and eliminating the use of all toxic products. Fourteen chemicals found in many cleaning supplies we all use are on the EPA's list of "priority pollutants"; among these 14 chemicals are benzene which is found in many all-purpose cleaners, naphthalene which is found in bleach and nitrobenzene which is found in carpet cleaners. The consultants who developed these solutions will gladly share their results with you. They are Safe Consulting For the Earth, P.O. Box 435, Moran, Wyoming 83103.

Integrated Pest Management is another success story waiting to be implemented. It eliminates scheduled spraying of chemicals to control pests at any location, spraying only occurs when all other options are unsuccessful. Instead, it relies on better maintenance and housekeeping practices, such as controlling water leaks and food refuse. Unfortunately, many school systems routinely spray for pests even though these sprays, which contain carcinogens and mutagens, are particularly dangerous to children. The =Ann Arbor, Michigan, public schools changed from routine spraying to IPM. During the first year, they only had to spray once and during the second year, I believe they did not have to spray at all.

I also want to urge you to have environmentally responsible conferences. Regardless of the topic of the conference, you will serve food, use energy, distribute materials and have name badges. Regardless of the topic, you can reduce solid waste, use energy efficiently and prevent pollution. For example, the room we are now in has a temperature in the 60s and many of us are uncomfortably cold. It is using an excessive amount of energy to keep the room this cool. Look at the napkin we were given at breakfast today. They are made from virgin paper and bleached with chlorine when they could have been made from 100 percent post-consumer content and not rebleached. It would be a lovely mocha color and very soft and absorbent. The State of Missouri and the Federal General Services Administration are purchasing such napkins. Other companies also make them. I urge you to have your agency purchase them.

Initially, the hotel or conference center may balk at your requests, but this Sheraton Hotel needs us as much as we need them. The contract for your conferences should state exactly how the facility will handle energy waste, solid waste and pollution prevent. If they refuse, find a facility that will cooperate. After a few such conferences, facilities will be skilled in operating in this new manner and it will become routine. And we will all benefit from the environmentally responsible result that will occur.

Thank you.

PLENARY SESSION SUMMARY

SESSION NAME: Connecting For Enhanced Coordination Between Agencies and Associations

MODERATOR(S) NAME: Gerald Kotas
David Thomas

NAMES OF SPEAKER: John A. E. Hannum

DAY AND TIME OF SESSION: Thursday, April 29, 8:30 - 10:00 A.M.

DOD POLLUTION PREVENTION PROGRAM

John A. E. Hannum
Pollution Prevention and Hazardous Materials Control
Office of the Chief of Naval Operations
Washington, D.C.

1. INTRODUCTION:

Almost 32 years ago exactly, the United States launched CDR Alan Shepard on the first suborbital "space" flight by an American. Today, as then, I believe that the Navy and DOD are at the forefront of change. We have crossed the threshold of environmental awareness and accomplishment.

- DOD Environmental budget FY93 $3.7B up 27% from FY92, four-fold increase since 1987
- 3M employees and 1.5M dependents, 1400 installations worldwide
- Control of land area of 25M acres, equivalent to Tennessee

The Nation's and DOD's environmental strategies have concentrated on "end of the pipe" waste management and treatment for the last two decades. However, we have not solved our HM and HW problems. We now recognize the need to fully address every aspect of our business practices in order to reduce pollution in progress at every point in our work - not just at end of the pipe. That is pollution prevention.

- Three pillars for DOD Environmental Management - PAST, PRESENT, FUTURE

John A. E. Hannum - "Connecting for Enhanced Coordination"

- DOD Goals for Action:

  1. Have all cleanup processes in place within 10 years
  2. Attain full and sustained compliance with all Federal, state and local laws and regulations
  3. Reach out to public - building trust and communication
  4. Prevent pollution to eliminate future environmental problems

2. DOD AND NAVY POLLUTION PREVENTION POLICY:

Although DOD and Navy facilities perform different functions and processes from each other and from much of the private sector, we can all benefit from making P2 a management priority and a workplace reality. Efforts to improve the environment are closely tied to other business and community objectives. To succeed, all business, including the federal sector, must constantly seek ways to deliver superior products and services to their customers. As Edward Fox stated in the first edition of Pollution Prevention Review, "Profit is the reward for, and the measure of, how well a business is satisfying its customers, and as a result, its stockholders and its employees". We often fail to understand that Federal facilities have the same objectives as private profit-centered organizations. While we can easily identify DOD's customers and employees, we often fail to recognize that our "stockholders" are the Nation's taxpayers. Our reward is not profit, but the cost-effective use of the taxpayer dollar. P2 is not only a sound environmental principle, it makes economic sense as well.

3. APPROACH:

New regulations focus our attention on hazardous materials released into the environment. These "new" pollution sources, like air emissions, are causing us to look again at the way in which we do our business. The DOD and Navy pollution prevention strategies focus on preventing pollution through source reduction, recycling and waste minimization - not through treating end-of-the-pipe wastes. The Pollution Prevention Act of 1990 endorses this approach. The proposed Executive Order, RCRA and CERCLA reauthorization legislation, place a priority on pollution prevention as well.

First, we must reduce pollution at the source by reducing the entry of hazardous materials into our workplace. This includes the acquisition process by eliminating the use of certain HM in the production of DOD purchased weapons systems, through efforts to replace processes and operations that create hazardous material releases with ones that do not, through HM substitution, and through improved HM management. The approach to pollution prevention prescribed in the P2 Act of 1990 is premised on the reasonable presumption that where less toxic materials can be used in lieu of more toxic ones, the environment, public health and safety will benefit. But the methodology and criteria for deciding whether a substitute for a toxic chemical is better or worse than the one it replaces must be established with care. Such efforts require a full technical understanding of what substitutes are acceptable for particular applications. Replacement of a toxic material with a less toxic material, that diminishes performance or increases servicing or replacement of a weapons system, may create more waste than the original

process. Lengthy, costly and effort-intensive campaigns to reduce the use of toxic materials that may result in little, if any, gain for public health and safety or the environment must be avoided.

Second, we must recycle and reutilize HM wherever and whenever possible.

And third, we must continue to identify ways of treating waste streams to reduce waste disposal. We may never eliminate all sources of end-of-the-pipe pollution, but we must improve our ability to reduce the volume of any HW disposed.

4. EXAMPLES OF DOD AND NAVY P2 PROJECTS:

The Naval Supply Systems Command, together with the naval Sea Systems Command, has established low lead (<0.06 wt. %), low VOC haze grey paint, for ships in California. We are no longer purchasing any high lead, high VOC paints, within the supply system. The Naval Sea Systems Command also has a five year plan to reformulate 150 of the most common types of paints to less than 0.005 wt. % lead.

The Air Force has prohibited the use of certain hazardous and environmentally damaging materials in the design, manufacture and operation of the new F22 fighter plane with no sacrifice of cost, performance, or schedule. Prohibited chemicals include CFCs, cadmium and chromium.

As part of the Tidewater Interagency Pollution Prevention Program in Norfolk, Virginia, the Air Force, Army, NASA, and Navy have jointed together with EPA on a variety of pollution prevention initiatives. A Memorandum of Understanding formalizes roles and responsibilities and establishes a framework for developing, implementing and monitoring P2 and energy conservation initiatives.

The Naval Air Warfare Center at Warminster, Pennsylvania, was selected for the National EPA Administrator's Award recognizing excellence in efforts to achieve a cleaner environment. The award was for the development of a new single coat corrosion prevention system called UNICOAT. UNICOAT replaces the traditional primer and topcoat paint systems used on aircraft. The new process provides several benefits, such as reduction in VOC emissions, reduced materials use, reduced paint removal and better component stability.

The Department of Defense is replacing methylene chloride and phenol-based paint strippers with a variety of mechanical and nonhazardous chemicals paint strippers. Among them are plastic media blasting and a Xenon flashlamp/carbon dioxide pellet blast depainting system being developed by the Air Force and Navy jointly.

The Navy has converted many of its organic solvent parts washers to high pressure, aqueous system parts washers, eliminating large quantities of halogenated solvent and yielding a cost avoidance of over $150,000 per parts washer installed. Other similar efforts have been made in the areas of hydraulic fluid reuse, ion vapor deposition of aluminum to replace cadmium plating and closed loop paintgun washers.

Kelly Air Force Base in San Antonio, Texas, has replaced all cyanide stripping baths with non-cyanide strippers with a concomitant cost avoidance of $300,000 annually of treatment and disposal costs.

The Naval Air Weapons Station, Pt. Mugu, California, has developed a unique, highly effective centralized hazardous material inventory control system called HICS. In the full year of operation, HM purchases decreased 49% and HW disposal decreased 73%.

These are just some of the many examples where DOD technology and engineering expertise have been brought to bear on a variety of P2 problems.

5. CONCLUSION:

- P2 is the future
- Gets senior management attention
    1. Saves money
    2. Increases efficiency
    3. Improves overall quality, as well as reduces risks to public health and the environment
- Need to look for value added
    1. $75B spent last year on environmental compliance, an avoidable investment, yielding little or no return

DOD and Navy committed to setting the standard for the Nation and the world for investing in environmental solutions that result in cost-effective operations. Up-front P2 strategies will set the future standards for cost-effective environmental excellence. P2 is a never-ending process. Ultimately, P2 effectiveness depends on the training of every individual to recognize and take responsibility for waste in the workplace.

6. CHALLENGE:

We are committed to P2 and will continue to dedicate both headquarters and facility resources to solve pollution problems. We need each other's help. We need the states and industries continued help to become more aware of ways in which existing maintenance procedures and those developed for new systems can incorporate environmentally sensitive materials, processes and maintenance practices.

John A. E. Hannum - "Connecting for Enhanced Coordination"

What states can do to help DOD installations:

- Understand what DOD does and does not do

    1. Not like industry
    2. Not manufacturing - maintenance, repair, support only
    3. Vastly different types and numbers of processes

- Recognize the difference between industrial and nonindustrial facilities.

    1. Solutions will be vastly different

- Where decisions are made in weapons systems acquisition - when base says can't do, may not be in their hands.

My challenge to you is this, let's find solutions with:

- new approaches

- new technologies

- and a new vision

Solutions whereby the DOD, industry and the states can work together to discover and implement efficient and cost-effective means of leveraging our resources; solutions that move all of us up the hierarchy of pollution prevention. This conference is an important step in the process.

Federal Role in Policy-Making

- Federal Facilities Multi-Media Enforcement/Compliance Initiative
  - P^2 Opportunity Profiles
  - Emphasis on P^2 Solutions to Address Compliance Problems
  - Federal budgeting process supports P^2 projects as solutions to areas of non-compliance
  - ORD/RREL will provide technical P^2 opportunity assessment assistance to Regions
- The Goal of the Federal Facilities Enforcement Program is to incorporate pollution prevention into 25% or more of all enforcement settlements

Federal Role in Research and Development and Technology Transfer

- Objective:
  - Develop, evaluate, and promote pollution prevention opportunities, options, and approaches through research and development, technology transfer, and information dissemination that emphasizes prevention
- Technology Transfer:
  - Waste Reduction Evaluations at Federal Sites (WREAFS) Program (EPA/ORD)
- Pollution Prevention Information Clearinghouse (PPIC/PIES): by mid FY 93, establish a separate Federal mini-exchange/database (FAME)

"Green Government Challenge Initiative"

January 93 FR Notice – Environmental Leadership Program; national voluntary program to encourage and publicly recognize environmental leadership and promote pollution prevention

Strategy — Expand Environmental Leadership Program to include Federal agencies and facilities

Strategy — "Green Government Challenge Initiative", a dual component proram:

1) Statement of environment principles emphasizing pollution prevention, sustainable development, and "beyond compliance" management programs

2) Applications for "Model Installations"

Joint DOE/EPA Pollution Prevention Initiative - April 1992

- Achieve participation in EPA 33/50 program, with a 50% reduction in GOCOs by 1995 and 33% for other DOE facilities by 1997
- Strive to reduce release of 17 chemicals of concern (33/50) DOE-wide for installations not required to report under SARA Title III
- DOE Secretarial Directives issued September 1992 implementing TRI reporting and 33/50 reduction for all DOE facilities.

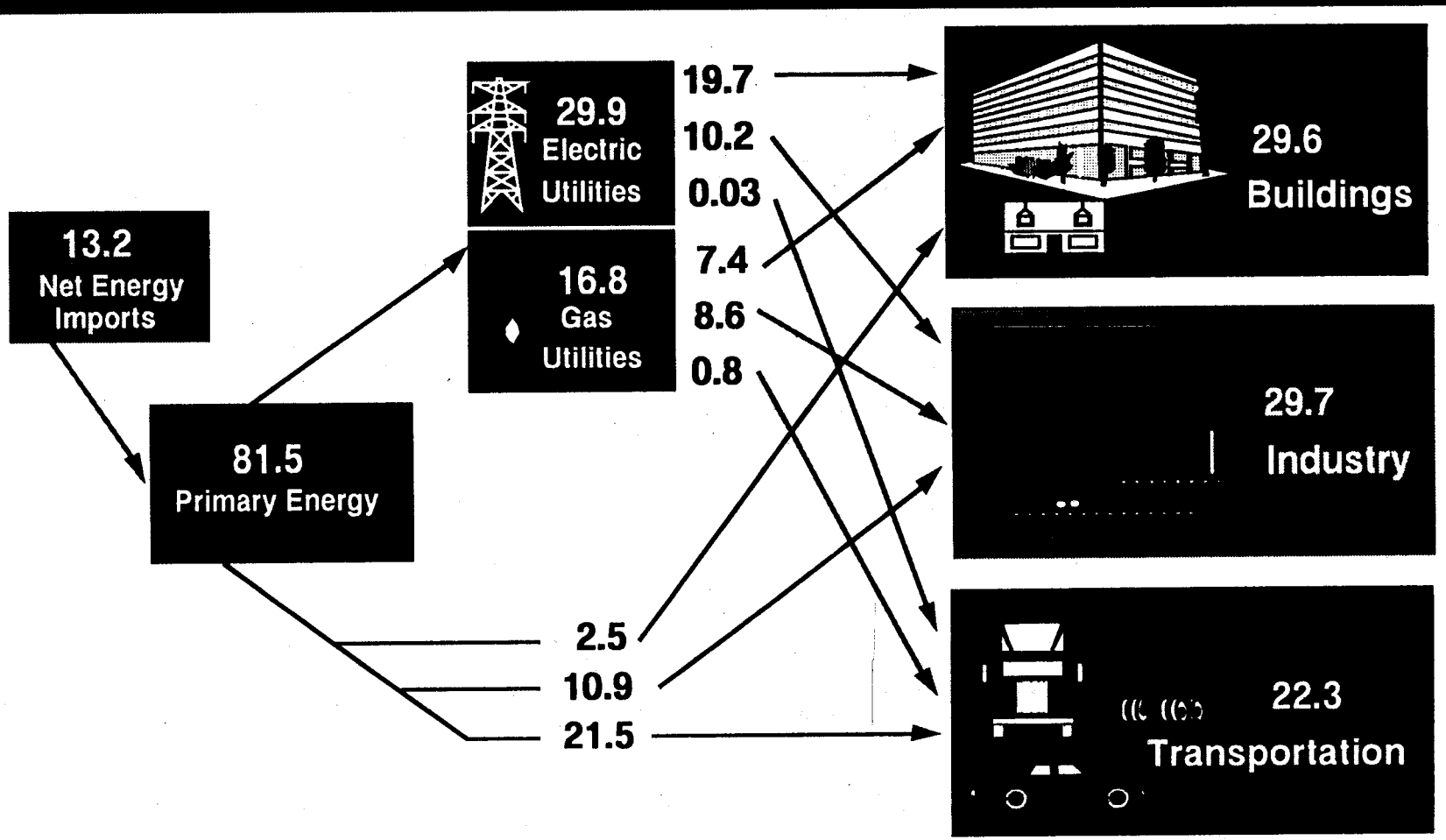
ENERGY EFFICIENCY AND RENEWABLE ENERGY

PROGRAM SUMMARY

GERALD F. KOTAS
SENIOR ENVIRONMENTAL ADVISOR
OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY

APRIL 29, 1993

U.S. Primary Energy Flows in 1991
(Quads)



Source: EIA, Annual Energy Review 1991
(includes electricity generation and distribution losses)

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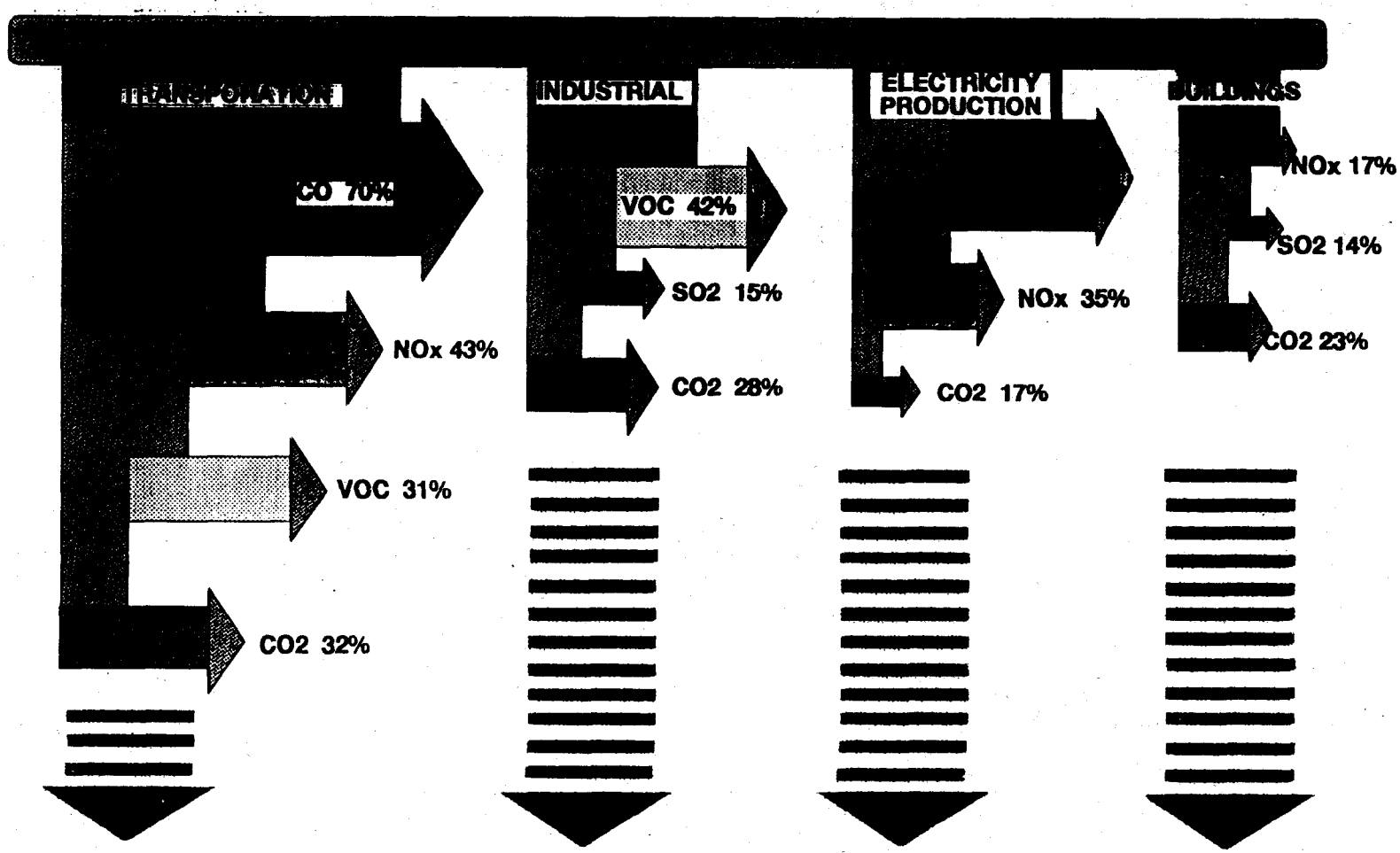
POLLUTION LOADINGS AND COMPARATIVE RISK CATEGORIES - ENERGY SECTOR

ALL ITEMS ARE TO SCALE



RISK AREAS AFFECTED:

Climate Change
Criteria Air Pollutants
Habitat Alteration
Toxic Air Pollutants
Underground Storage Tanks
Accidental Releases (eg oil spills)

RISK AREAS AFFECTED:

Climate Change
Stratospheric Ozone
Criteria Air Pollutants
Habitat Alteration
Toxic Air Pollutants
Worker Exposure
Toxic Substances
Superfund
Ground Water
Water Point Sources

RISK AREAS AFFECTED:

Climate Change
Criteria Air Pollutants
Habitat Alteration
Toxic Air Pollutants
Hazardous Waste
Solid Waste
Toxic Substances
Groundwater
Underground Storage Tanks

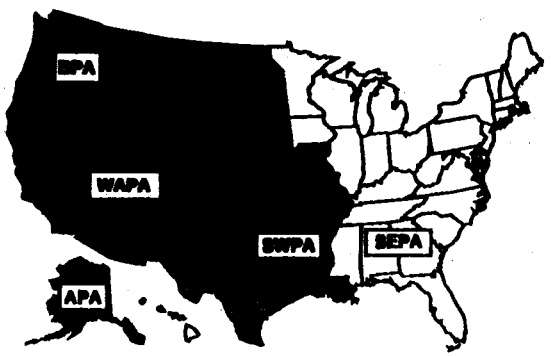
RISK AREAS AFFECTED:

Climate Change
Stratospheric Ozone
Criteria Air Pollutants
Habitat Alteration
Toxic Air Pollutants
Worker Exposure
Water point Sources
Solid Waste
Hazardous Waste

prevention

FUTURES

Energy Efficiency and Renewable Energy



Power Marketing Administrations

Assistant Secretary
Energy Efficiency & Renewable Energy

CE Support Offices

Office of Management & Resources

Office of Planning & Assessment

Golden Field Office
Golden, CO

National Renewable Energy Laboratory

Deputy Assistant Secy
Office of Utility Technologies

Deputy Assistant Secy
Office of Industrial Technologies

Deputy Assistant Secy
Office of Transportation Technologies

Deputy Assistant Secy
Office of Building Technologies

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Energy Efficiency & Renewable Energy
Major FY 1994 Budget Thrusts

- **State Partnerships**
- **Market Deployment**
- **Technology Investment**
- **Natural Gas Utilization**
- **Environmentally Conscious Technologies**
- **Federal Sector Cooperation**
- **Energy Policy Act of 1992**

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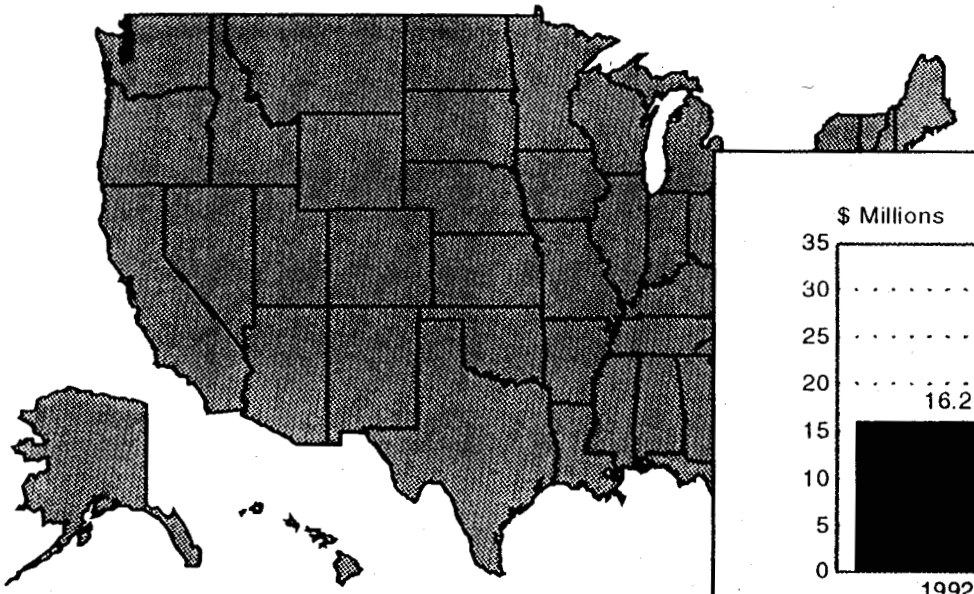
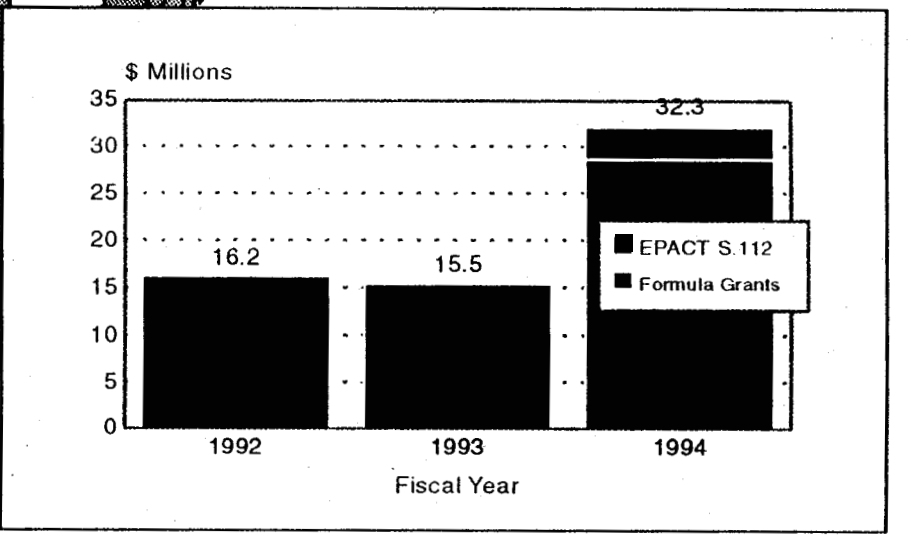
Office of Technical and Financial Assistance
State Energy Conservation Program*

PROGRAM OBJECTIVE: To support the development and implementation in each State of energy efficiency and renewable energy programs with the goal of achieving an improvement of 10 percent or more in the efficiency of energy use in the year 2000.



SECP Funding Profile



*Energy Conservation Appropriation

U.S. DEPARTMENT OF ENERGY

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SESSION SUMMARY

SESSION NAME: Benefits of Regulatory and Non-regulatory Pollution Prevention Programs

FACILITATOR(S) NAME: David Hartley, Chief
Technology Clearinghouse
Office of Pollution Prevention and Technology Development

DAY AND TIME OF SESSION: Thursday, April 29, 1993, 10:30 a.m. - 12:00 p.m.

APPROXIMATE NUMBER OF PARTICIPANTS:

OBJECTIVE OF SESSION:

Limited funds are available to support pollution prevention programs which often rely on federal or state money to operate. Additionally, pollution prevention approaches to environmental protection are an appealing alternative (or supplement) to traditional command and control regulatory enforcement approaches for both regulatory and nonregulatory programs. These two factors have created conflict and competition for scarce pollution prevention funds.

Objectives are:

- discuss the benefits and need for both regulatory and nonregulatory pollution prevention programs.
- identify a list of complimentary regulatory and nonregulatory pollution prevention activities.
- provide examples of how regulatory and nonregulatory programs can strive to work together.
- identify sources of funding for other regulatory and nonregulatory programs.

KEY POINTS MADE BY SPEAKERS AND PARTICIPANTS:

David Hartley, Chief, Technology Clearinghouse, Office of Pollution Prevention and Technology Development (OPPTD), California Department of Toxic Substances Control:

I. California's Pollution Prevention Program is housed in the regulatory Department of Toxic Substances Control.

Benefits of Regulatory and Non-regulatory Pollution Prevention Programs

II. OPPTD utilizes both regulatory and traditional non-regulatory approaches to assist industries with the implementation of pollution prevention.

III. Regulatory approaches include:

A. Facility planning requirements:

Source reduction plans and reports are required for facilities that generate specified amounts of waste. Facilities are required to conduct a source reduction audit and develop a report that includes source reduction options and implementation timelines. A recent survey of affected generators has shown the following:

1. 74% considered the source reduction planning process worthwhile.
2. 68% claimed measurable reductions as a result of the planning process.
3. 51% claimed reductions greater than 10%.
4. 49% profited from the review and planning process.
5. 9% claimed reductions greater than 50%.

B. Enforcement settlement agreements:

1. Pollution Prevention credits are negotiated with facilities that have enforcement actions pending against them. Specific pollution prevention projects can be conducted in lieu of a portion of the monetary fine.

C. Pollution Prevention in facility permits:

1. Standard language requiring pollution prevention audits and pollution prevention plans is included in facility permits.

D. Surveillance and enforcement inspectors:

1. Inspectors are required to complete a simple pollution prevention checklist when inspecting facilities. Inspectors are encouraged to provide documents and recommendations for implementing pollution prevention at facilities.

IV. Non-regulatory approaches:

A. Information development and dissemination:

1. Waste audit studies

2. Fact sheets
3. Self audit checklists
4. Conferences and workshops
5. Video

B. Regulatory and technical assistance:

1. The incinerable waste minimization project
2. Geographically targeted pollution prevention project
3. Aqueous cleaners exposition

C. Financial assistance:

1. Waste reduction grants program
2. Low interest loan program for waste reduction technologies

Cindy McComis, Director, Minnesota Technical Assistance Program MNTAP:

I. MNTAP is an example of a non-regulatory technical assistance program funded by the Minnesota (MN) Office of Waste Management and located at the university of Minnesota.

II. MNTAP has worked with the regulatory agency (MPCA) since inception in early 1985, beginning with:

A. targeted industry efforts for both regulatory (MPCA) and technical assistance (MNTAP)
B. joint development of printed materials
C. joint federal projects (RITTA in 1986)

III. Benefits of working together:

A. Recommendations from the NACEPT report "Building State and local Pollution Prevention Programs" for effective programs include:

1. strong, fair, and consistent regulatory programs
2. consistent pollution prevention messages

B. Gain from sharing regulatory and technical assistance knowledge and making referrals in both directions.

IV. Examples of collaborative efforts in MN:

A. PPIS and other EPA grants
B. cross training
C. Lake Superior Partnership Project
D. Small Business Assistance Program (CAA)
E. Coordination on pollution prevention staff team
F. Regulatory review and interpretation coordination

Eric Kilbers, Pollution Prevention Coordinator, Minnesota Pollution Control Agency (MPCA):

I. Pollution prevention activities in regulatory programs:

A. training
B. compliance inspection
C. enforcement
D. regulatory development
E. permitting
F. environmental review - for environmental assessment worksheets and environmental impact statements
G. toxics and pollution prevention reporting coordination for progress reports
H. pollution prevention coordination team - pollution prevention staff team
I. encourage partnerships - Lake Superior Partnership for multimedia inspections
J. technical transfer and referrals to MNTAP

II. In summary, pollution prevention programs should be coordinated in the state to provide the best service to industrial clients and to avoid duplication of efforts.

David Liebl, Pollution Prevention Specialist, University of Wisconsin - Extension:

I. Effective P2 service from universities include:

A. Coordination with State regulatory agencies
B. Training to raise awareness for pollution prevention opportunities
C. A broad range of assistance that is credible
D. Effective tools to reach a large number of businesses
E. Education (local community interaction), student interns/retired engineers, industrial extension, printed education materials
F. Technical assistance, workshops, site visits, resource databases, applied research

RECOMMENDATIONS FOR FURTHER DISCUSSION/ACTION:

I. What do technical assistance programs do when you see RCRA violations?

- A. Bring to generators' attention
- B. Use as a way to point out an opportunity
- C. If there is a danger to human health and the environment, report to the regulators

II. Can technical assistance be provided for a modest fee?

- A. Free aspect of services are used as a selling point
- B. Some programs do charge fees for services (audits, etc.)

III. Do CA or MN have written plans on how pollution prevention can be integrated into regulatory programs?

- A. CA has an overview report

IV. How is regulatory integration measured?

- A. Based on dollars spent from year to year
- B. Difficult to track

V. What kind of technical assistance follow-up is conducted?

- A. Overall surveys of industry periodically
- B. Telephone follow-up twice per year

VI. Does California use focus groups to get input?

- A. On a pilot basis - included in CA overview report

VII. Other

- A. Perception of regulators as "bad guys" and ways to dispel this
- B. Sending blank inspection forms to regulated community

SESSION SUMMARY

SESSION NAME: Industry Case Studies

FACILITATOR(S) NAME: Randy Price, DuPont Co.
John Warren, RTI

DAY AND TIME OF SESSION: Thursday, 4/29/93, 10:30 - 12:00

APPROXIMATE NUMBER OF PARTICIPANTS:

OBJECTIVE OF SESSION:

Presentation of the various driving forces that have successfully made P2 a priority at large and small companies and of an understanding of the different corporate cultures.

KEY POINTS MADE BY SPEAKERS AND PARTICIPANTS:

There are many program approaches to P2. There may be common elements among different programs, but there are also many differences. We must be careful not to stymie innovation and creativity by, albeit well-meaning, regulations that force a generic, cookie-cutter approach to P2.

John Warren:

- Environmental excellence is a function of a variety of attributes; the more a firm has, the more likely it is to achieve environmental excellence.
- Firms need to address management, measurement, mission/vision, and economic issues.
- Two key approaches to excellence are better questions and a new environmental paradigm-industrial ecology.

Tom Zosel:

3M has had pollution prevention (source reduction/recycle/reuse) as a core corporate value since 1975. The foundation of the successes that have been achieved is participation by each and every employee. 3M's Pollution Prevention Pays (3P) program is based on top management support, empowerment of employees, and recognition of accomplishments. Pollution prevention is now ingrained as an integral part of the corporate culture.

Session Name - Industry Case Studies

Randy Price:

- The DuPont company has an active waste reduction/pollution prevention program.

- This program consists of a three tiered approach. The first tier focuses on present activities and facilities. At this tier, we look for immediate results typically requiring a relatively low investment and results with a relatively high rate of return.

- The second tier focuses on near-term changes by upgrading existing processes by using existing technology. These initiatives tend to take from 1-5 years to complete.

- The third tier focuses on developing new technology and requires basic research and development. These initiatives tend to take more than 5 years to complete. This tier usually results in major capital investment through either major process modification or construction of new facilities. The rate of return for these initiatives tends to be lower than the other two tiers, as well as having a lower probability of success.

- DuPont has several waste reduction goals for such categories as air toxics, air carcinogens, and hazardous wastes, which act as milestones for the company's program. To properly plan for the successful achievement of the goals, as well as to track our progress, the company has developed a Corporate Environmental Plan (CEP). The CEP integrates environmental planning, as well as identifies the initiatives required to achieve our environmental commitments.

- The company has implemented the Chemical Manufacturers Association's Responsible Care® program, whose purpose is to promote the continuous improvement in environmental performance of member companies.

RECOMMENDATIONS FOR FURTHER DISCUSSION/ACTION:

These are concepts that the Roundtable can address, so as to drive a sense of national consistency.

- Facilities planning (from state rights) should work toward national consistency.

- Required plans should be flexible so that they can be used as a tool/motivator for progress. (Regulations have not provided the right drivers for progress - motivators.)

- Encourage use of waste hierarchy - drive upward movement, but recognize recycle, reuse, etc.

- For rewards/recognition - offer some carrot (e.g., expedited permits).
  Make them difficult to achieve so as to be a real honor.

DuPont's Pollution Prevention Program

- **Committed to facility planning to reduce waste and emissions, utilizing the pollution prevention hierarchy giving priority to source reduction options.**
- **Committed to a series of specific goals for waste and emissions reduction, including**
  - **Air Toxics**
    - » **60% reduction in U.S. between 1987 and 1993**
    - » **10% per year for international operations thru 1993**
  - **Air carcinogens**
    - » **90% reduction in global operations by 2000**
  - **Hazardous Waste**
    - » **35% reduction in global waste generation between 1990 and 2000**
  - **Land Toxics**
    - » **Eliminate all toxic discharges to the ground by 2000 or verify that they have become non-hazardous**
  - **EPA's 33/50 Program**
    - » **50% reduction in U.S. for 17 chemicals in aggregate, identified by U.S. EPA between 1988-1995**

DUPONT
ENVIRONMENTAL
STEWARDSHIP

DuPont's Pollution Prevention Program (continued)

- Approach is three tiered
- Tier One
  - Focuses on current activities and facilities with line organization operating facilities smarter
  - Seek immediate results
  - Typically requires relatively low investment
  - Typically has a relatively high rate of return
- Tier Two
  - Focuses on near term changes by upgrading existing processes using existing technology
  - Typically takes from 1-5 years to complete
- Tier Three
  - Focuses on developing new technology and requires basic research and development
  - Typically results in major capital investment through either major process modification or construction of new facilities
  - Typically requires a relatively high investment with completion taking more than 5 years

DU PONT
ENVIRONMENTAL
STEWARDSHIP

Managing and Driving Pollution Prevention

- Program implementation is the responsibility of each business within a Corporate framework
- Each business develops an annual business plan which includes as a major component an environmental plan
- Environmental plans function as a tool to integrate environmental and business thinking throughout DuPont.
- All individual environmental plans are rolled up to form a Corporate Environmental Plan (CEP)
- The CEP identifies planned environmental initiatives and their expected results (i.e, compliance, policy and goals).

Managing and Driving Pollution Prevention (continued)

- **All sites have at least one waste reduction coordinator**
- **Most sites have waste reduction teams**
- **Networks have been established that share success stories and technologies between facilities**
- **Reduction goals are widely communicated**
- **Data systems have been established to track progress**
- **Active reward and recognition program**
  - **Environmental Excellence Awards**
  - **Special Compensation Program**

DJ PONT
ENVIRONMENTAL
STEWARDSHIP

Key Learnings

- Everyone's resources are limited and we must ensure that whatever we do adds real value to society.
- Congress, EPA and the States need to support innovation and be judicious in its use of command and control regulations.
- Many current rules drive end-of-pipe treatment rather than pollution prevention.
- Laws and regulations should be performance based and not prescriptive. Goals should be established, but the means for achieving them should be left to the regulated community.
- Priorities should be established based on risk and not the squeaky wheel.

Characteristics of Environmental Excellence in Small Companies

National Roundtable of State Pollution Prevention Programs 1993 Spring Conference

San Diego, California April 28 - 30, 1993

John L. Warren, Program Director

Environmental Management Systems
Research Triangle Institute
Research Triangle Park, NC 27709

RTI

Philip B. Crosby (14 steps)

- Develop management commitment
- Organize quality improvement team
- Develop quality measurement approach
- Evaluate cost of quality
- Improve quality awareness
- Institute corrective action
- Establish an ad hoc committee for zero defects program
- Train supervisors in quality
- Hold a zero defects day
- Set goals
- Remove cause or errors or problems
- Establish awards and recognition program
- Establish quality councils
- Do it over again

RTI

Malcolm Baldrige National Quality Award

Core Values and Concepts

- Customer-driven quality
- Continuous improvement
- Employee participation and development
- Fast response
- Design quality and prevention
- Long-range outlook
- Management by fact
- Partnership development
- Corporate responsibility and citizenship

RTI

Martin Marietta Astronautics: Keys to Building a P2 Culture

1. Ask provocative questions
2. Create a climate of openness
3. Lead with technical language
4. Build skills, awareness and an environmental ethic
5. Stay true to your goals
6. Share innovation
7. Pursue leadership

RTI

Laws of the Fifth Discipline (Peter Senge)

1. Today's problems come from yesterday's "solutions".
2. The harder you push, the harder the system pushes back.
3. Behavior grows better before it grows worse
4. The easy way out usually leads back in.
5. The cure can be worse than the disease.
6. Faster is slower.
7. Cause and effect are not closely related in time and space.
8. Small changes can produce big results — but the areas of highest leverage are often the least obvious.
9. You can have your cake and eat it too — but not at once.

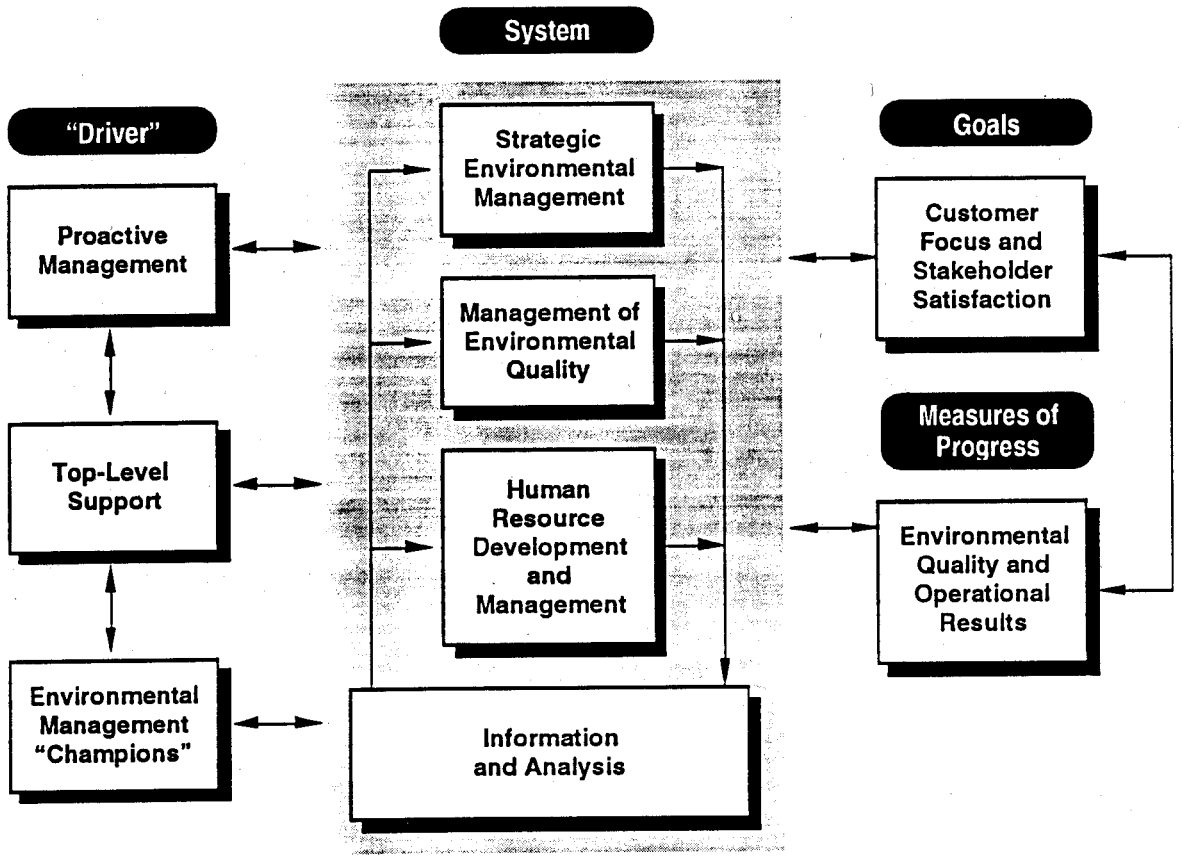
RTI

Definition of Excellence in Environmental Management

“ For purposes of our research, we define excellence in a systems-oriented manner. A systems approach emphasizes the whole, rather than any individual part. Therefore, we define excellence as a bundle of attributes, with firms having different combinations of “excellence” characteristics. ”

RTI

Excellence in Environmental Management Framework



Motivations to Continue Environmental Management Programs

- Environmental regulations
- Waste disposal and waste management costs
- Public relations
- Liability
- Customer requirements
- Product output (i.e., improve efficiency or yields)
- Corporate mission or philosophy
- "The right thing to do"

RTI

Excellence-Enhancing Questions

- If we knew we could not fail, what would we attempt to do?
- What do we have to believe to achieve zero pollution?
- What can we do to make zero an achievable goal?

Jack Welch's Six Rules

1. Face reality as it is, not as it was or as you wish it were.
2. Be candid with everyone.
3. Don't manage — lead!
4. Change before you have to.
5. If you don't have a competitive advantage, don't compete.
6. Control your own destiny — or someone else will.

RTI

SESSION SUMMARY

SESSION NAME: Fostering P2 in the Non-Corporate Arena

FACILITATOR(S) NAME: Jack Luskin, Massachusetts Use Reduction Institute
Olga Cory, U.S. EPA-Headquarters

DAY AND TIME OF SESSION: Thursday, 2:00-3:30

APPROXIMATE NUMBER OF PARTICIPANTS: 31 (by attendance sign-up)

OBJECTIVE OF SESSION:

Traditionally, pollution prevention efforts by state and Federal agencies (such as the 33/50 program) have been targeted at corporate industry. The objective of this session is for participants to share information and strategies for advocating pollution prevention through other, less traditional, organizations such as labor unions, community, public interest, and environmental groups, and trade associations.

KEY POINTS MADE BY SPEAKERS AND PARTICIPANTS:

Speakers:

Stanley Eller, Natural Resources Council of Maine
Dana Duxbury, Wastewatch Institute
Lorraine Urbiet, EPA Region III (tentative)
Klassina VanderWerf, Center for Values and Social Policy, University of Colorado

For additional information, contact the person in ( ).

1. There are numbers of examples of cooperation between environmental groups, local and state government, and industry, in fostering pollution prevention. (Eller)

2. There is an interesting United Steelworkers International Union initiative that will make P2 a part of contract negotiations. This approach may serve as a model to show that jobs and the environment are NOT mutually exclusive. (Urbiet)

3. There is research currently being conducted on cultural resistance to change, particularly as it applies to P2. (VanderWerf)

4. There is a need to educate the general public. One approach is through curriculum for grades K-12. The approach must be well thought-out and the implementation must be well planned. (Duxbury)

NO RECOMMENDATIONS FOR FURTHER DISCUSSION/ACTION

SESSION SUMMARY

SESSION NAME: Maximizing the Potential of Local Governments

FACILITATOR(S) NAME: Kathryn Barwick
California Department of Toxics

DAY AND TIME OF SESSION: Thursday, 2:00 p.m.

APPROXIMATE NUMBER OF PARTICIPANTS: 32

OBJECTIVE OF SESSION:

Provide input to Roundtable regarding issues (come up with recommendations).

The Roundtable, states, and the U.S. EPA should leverage pollution prevention resources by increasing the emphasis on local government programs (i.e., cities, counties, districts, municipalities). Both regulatory and nonregulatory pollution prevention program opportunities exist at the local level. Local governments are essential to the success of pollution prevention programs because of:

1. the direct contact between local government agencies and the regulated community
2. the existing infrastructure for community services
3. increased potential to garner political support for pollution prevention initiatives

This session's objectives are to:

1. explore the approaches currently used by existing local government pollution prevention programs
2. identify other types of local programs that could promote pollution prevention
3. discuss how pollution prevention can be integrated into other local agencies' programs
4. discuss how to gain resources for local programs

Each speaker will have ten minutes to discuss this program. The group will then explore the above objectives, with a goal of making recommendations for further action by the Roundtable.

KEY POINTS MADE BY SPEAKERS AND PARTICIPANTS:

<u>Speakers list:</u>

Tom Hersey or Mike Raab
County of Erie Department of Environment and Planning
(716) 858-7674

Session Name - Maximizing the Potential of Local Governments

Al McCord, Economic Development Manager
City of Anaheim Economic Development
(714) 254-4317

Phil Bobel, Manager of Environmental Compliance
Palo Alto Regional Water Quality Control Plant
(415) 329-2285

RECOMMENDATIONS FOR FURTHER DISCUSSION/ACTION:

The Roundtable should:

1. Change name to "National RT of Governmental P2 Programs" or "National RT of State and Local P2 Programs".
2. Have a session on local programs at every Roundtable (ongoing work group).
3. Encourage regional Roundtables to include local government Roundtables.
4. Develop active regional/local government Roundtables.
5. Define local role - provide guidance to States and Feds.

US EPA should:

1. Fund local programs via supplemental projects.
2. Grant fund directly to local governments (PPIS/media/community development grants).
3. Include local issues at "brown bag" presentations.

FOLLOW-THROUGH, INCLUDING CONTACT NAMES AND PHONE NUMBERS FROM PARTICIPANTS WHO COMMIT TO WORKING ON THIS ISSUE, AND ANY MILESTONES WITH APPROXIMATE TIMELINES:

We didn't get to commitments - barely touched the surface of the issues (short sessions!).

SESSION SUMMARY

SESSION NAME: Design for Environment

FACILITATOR(S) NAME: Kevin Dick, Manager
Business Environmental Program
Nevada Small Business Development Center

DAY AND TIME OF SESSION: Thursday, 2:00 - 3:30

APPROXIMATE NUMBER OF PARTICIPANTS: 60

OBJECTIVE OF SESSION:

Provide presentation and stimulate discussion of design for environmental issues.

KEY POINTS MADE BY SPEAKERS AND PARTICIPANTS:

Marty Spitzer, USEPA Pollution Prevention Division
Jocelyn Woodman, USEPA Pollution Prevention Division
Bob Ferrone, Digital Equipment

Marty Spitzer:

The Environmental Protection Agency's (EPA) Design for Environment (DfE) program concept originated in activities being undertaken in the private sector. DfE can be used to address a number of different sectors, such as printing, electronics, dry cleaning, freon replacement, as well as conceptually, in management structures. The theme of EPA's initiatives are that they're voluntary and cooperative efforts in which EPA provides assistance to industry and the states.

EPA's DfE efforts involve compiling information which has been collected by the agency over the years to use in identifying risks, toxicity, substitutes, and regulations that affect chemicals which are used in different business sectors. EPA is focussing on large industries that are composed of many small businesses. Three specific projects address printing, dry cleaning, and computer workstations.

The dry cleaning project is being conducted in conjunction with the Neighborhood Dry Cleaning Association. The project is beginning to conduct pilot projects to examine alternative cleaning processes. Information gathered in the project will be shared with trade associations. A Cleaner Technology Substitute Assessment (CTSA) project has been initiated. This project will help in identifying which P2 options have the least life cycle environmental impact and can be used to steer implementation of opportunities identified in conducting P2 opportunity assessments.

Session Name - Design for Environment

EPA has six grants which are to be used in funding research in chemical pathways. EPA will be holding a meeting on this topic next summer.

EPA is also working with business management accounting systems and financial analysis (particularly the Capital Budgeting Process) to see how environmental costs can be better integrated into these systems in order to steer pollution prevention through accounting.

EPA is working with the insurance industry to see how environmental factors can be used to affect policy and decision-making and promote pollution prevention. EPA's role is to provide information to the industry, sponsor research, facilitate dialogue, and promote training. EPA has been working with the Chartered Property and Casualty underwriters who wish to include pollution prevention in the training curriculum for certification.

EPA is also working with lending institutions in order to encourage lending for pollution prevention. This strategy may help to protect the banks investments by reducing environmental management costs and liabilities.

EPA has funded a curriculum development project at the University of Michigan which will develop curriculums for engineering and business programs.

Jocelyn Woodman - Printing:

EPA is involved with the printing industry in a cooperative DfE initiative. There is potential to formalize an environmental commitment or labeling program with the participating printing associations. The approach being used in the printing DfE project is to develop clusters of the chemicals used in printing operations and to prioritize which operations to focus on. In lithography, chemicals used in blanket-washing operations are the focus, while in screen printing, the focus is chemicals used for screen cleaning.

Four committees have been formed to evaluate the various chemicals and make the information understandable for small businesses. The chemicals are evaluated through the CTSA process and results are laid out in a matrix. The matrix does not identify which chemical is the best, but provides a summary of the evaluation for printers to consider.

Ms. Woodman noted that local organizations are critical for getting the information developed, through the DfE project, into the hands of small printing businesses. She felt that states should be involved in outreach, should get their state associations involved, and should assist in delivering information to them. State programs could also assist EPA in providing technical information about available pollution prevention techniques for printers. State programs could also participate in the development of implementation tools.

Marty Spitzer - Accounting:

EPA has already conducted some work on accounting, which appears in EPA's Pollution Prevention Benefits Manual. The Tellus Institute is now working on a follow-up report.

EPA's new strategy is to address costs in a business context. There are both private and societal environmental costs. The private costs are those which fall upon the company directly, and this subset of the total societal costs is what this project focuses on. The project's goal is to develop accounting systems which will be used by businesses to better account for the total private costs of the pollutions that they generate.

These types of cost are tracked through management accounting, which is a company's internal set of books, as opposed to financial accounting, which is reported externally, for instance, to the IRS and the SEC. In addition to focusing on management accounting, the project also is dealing with the capital budgeting process. This is the process that determines what investments a company will make and what these investments will be for.

EPA's strategy is to let businesses that do the accounting come up with the methods to better incorporate these internal environmental costs. EPA wishes to maximize the motivation of these stakeholders, in order to mobilize them into taking pollution prevention approaches through accounting mechanisms.

Several major participants in this project are the Institute of Management Accounting (90,000 members who voted the environment their top priority in 1992), the National CPA's Association (350,000 members), and the American Association of Cost Engineers. The Accounting project has prepared a fact sheet and distributed it, and currently, a network of interested organizations and individuals is being developed. A workshop to further discuss issues and directions is anticipated for later this year.

Bob Ferrone - Electronics:

The driving force behind DfE for the electronics industry is ISO 9000. This European initiative, which calls for packaging and product take-back, is forcing U.S. businesses to be players, in order to preserve their European market share. In Sweden, Volvo is pursuing a project to look at materials analysis for environmental impacts. The electronics is focusing on workstations as a vehicle to explore DfE issues. A major question is how life cycle analysis can address all of the issues involved. This life cycle information is unobtainable in available time frames. The time is now for industry, academia, and government, to come together and work on these issues. The workstation project has taken a system's approach in looking separately at materials, assembly, and disposal. Disposal costs of computers are just beginning to be looked at, since previously, manufacturers haven't been responsible for this.

Life cycle evaluation can't stand apart from how materials are used in processes. For instance, life cycle analysis may indicate chlorine as a least preferred chemical. However, without chlorine, sand used in chip manufacturing can't be sterilized, which, therefore, has a number of implications for manufacturing changes, which may have a more significant environmental impact. In pursuing the systems approach, the Electronics DfE project organized seven task forces, involving a number of computer companies, to deal with different stages and systems that are used in the manufacturing and disposing of workstations.

In developing the project, the electronics firms originally didn't want federal involvement, but realized that a partnership, rather than a customer relationship, was needed to move forward. The electronics firms are now working together with EPA.

The electronics project has found that EPA has a ton of information that has ben collected over the years, but that doesn't get back to industry. In fact, the information is virtually impossible to extract from the agency, due to the manner in which it has been managed and the limitations of the variety of databases in which it has been entered.

Mr. Ferrone mentioned several areas which need to be addressed to support DfE initiatives. Modeling and basic research must be conducted by universities. Curriculums must be transitioned to incorporate environmental issues and pollution prevention. Resources need to be more effectively pooled in consortiums. Most critically, he stated that we need decisions and actions on faster time frames. American firms are competing in an international market and, therefore, with the decision time frames that are available in other countries. As an example of positive movement which is happening, he cited the work happening at the university in Lowell on plastics technologies.

He also cautioned that time frames for returns on investment need to be realistic. In the computer industry, a ROI of 10 years doesn't make any sense, since the technology being produced would be obsolete long before that, and so may the environmental technology being invested in. In electronics, LDfE is particularly important. Since computer products have such a short product life, due to changing technology, cradle-to-cradle recycling becomes very important.

As an example of the issues involved in evaluating materials substitution, Ferrone discussed the issues associated with eliminating lead. An alternative might be Bismuth, however, when you look at the extraction of Bismuth, there may be much worse environmental consequences than those posed by lead. On the other hand, most of the heavy metals, and 50% of the lead from computers, can be reclaimed if the manufacturer can get the boards back. Therefore, continuing to use lead and recycling it might be much less environmentally damaging.

RECOMMENDATIONS FOR FURTHER DISCUSSION/ACTION:

Participants were interested in how printing and other DfE initiatives were selected. They were also interested in how the Great Lakes Printing Initiative fit in with EPA's DfE project with printers and how duplication could be avoided.

Further explanation was provided on the work being conducted by Tellus Institute, which is involved in developing pollution prevention accounting cost software. It was suggested that information on the present state of accounting information systems be provided to state programs.

Session Name - Design for Environment

In projects to address comparisons of environmental impacts and benefits of various processes, it was suggested that industry consortiums identify potential alternative processes, and that universities, as neutral bodies, conduct the environmental evaluation of the processes.

The role of the Roundtable in DfE initiatives was discussed. It was felt that an important role was for the Roundtable to conduct outreach on DfE initiatives. It was also suggested that, when initiating DfE projects, EPA needed to establish up-front commitment of who would be responsible for delivering the training.

SESSION SUMMARY

SESSION NAME: Regulatory Integration/Multimedia Implementation

FACILITATOR(S) NAME: Lynn Persson
Lee Dillard

DAY AND TIME OF SESSION: Thursday, 4:00 p.m.

APPROXIMATE NUMBER OF PARTICIPANTS: 70+

OBJECTIVE OF SESSION:

Updates on work products that were planned at the Fall 1992 Roundtable conference and those ongoing at EPA.

Identify work products for this group for the future - develop interest ranking of topics for future meeting.

1. regulation/re-authorization
2. staff training
3. management/marketing
4. inspections
5. permits
6. enforcement
7. facility planning
8. funding
9. data & reporting

KEY POINTS MADE BY SPEAKERS AND PARTICIPANTS:

Speakers: Jocelyn Woodman and Lynn Vendinello

Shared matrix from Kerr report on States' efforts in integrating P2 into regulatory programs. Asked for people to look at their State and send in corrections. EPA presented status report on SRRP, solvent degreasing MACT standard, pesticide formulation and packaging metal products, machinery, and new effluent guidelines. Would like to receive feedback from states and give contact names for each rule.

Developing a multi-media regulation under CWA authority; ideas include, 1) prohibiting significant adverse impact or significant transfer to other media, 2) determining range below BAT to maximize discharges to water, but balance with air and waste, and require BAT maximum over time, 3) publicly reporting media transfers resulting from use of control technology as part of a permit's requirements, 4) expressing limitations in terms of total mass loadings of pollutants and concentration, or mass balance and concentration, 5) making the point of compliance for BAT in-plant, rather than at the end of the pipe.

NO FURTHER RECOMMENDATIONS

SESSION SUMMARY

SESSION NAME: Waste Exchanges

FACILITATOR(S) NAME: Donna Perla, U.S. EPA
Bob Smee, Pacific Materials Exchange
Joyce Mason, CALMAX

DAY AND TIME OF SESSION: Thursday, 4:00 - 5:30, 4/29/93

APPROXIMATE NUMBER OF PARTICIPANTS: 22

OBJECTIVE OF SESSION:

- Discuss/present what waste exchanges are about and what they can do.
- Present the Materials Exchange Network, which is an electronic waste exchange listing network.
- Discuss issues and possible solutions for long-term funding of waste exchanges.

KEY POINTS MADE BY SPEAKERS AND PARTICIPANTS:

- Materials exchanges have a dynamic role to play in advocating the creation of markets for recyclable materials, and in identifying wastes that are not recyclable and should be targeted for source reduction, as well as identifying generators of waste to target for source reduction.
- A national electronic network exists that allows all generators to readily list their recyclable materials in a national database and allows all waste exchanges in Canada and the United States to use this system for identifying available recyclable materials. The system is user-friendly and free to subscribers to waste exchanges. There is the ability to expand the structure and useability of the system. Twenty new waste exchanges will be dependent on the system and 30 existing waste exchanges are currently using it.
- CALMAX, who handles non-hazardous materials exchanges, gave a demonstration of how materials listed were used to construct an addition onto a local boys and girls club.
- Financial mechanisms to raise funds to start and continue operation of waste exchanges were discussed. Consensus was that an electronic network is good, but serves to enhance, rather than replace, waste exchanges.

NO FURTHER RECOMMENDATIONS

SESSION SUMMARY

SESSION NAME: Funding for Pollution Prevention Research

FACILITATOR(S) NAME: Madeline Grulich

DAY AND TIME OF SESSION: Thursday, April 29, 4:00 PM

APPROXIMATE NUMBER OF PARTICIPANTS: 15

OBJECTIVE OF SESSION:

Introduce Roundtable members to funders of research

KEY POINTS MADE BY SPEAKERS AND PARTICIPANTS:

1. Summary of funding organizations.

    a. There are many diverse funders.
    b. $145,000,000.00 was available in 1991, $95,000,000.00 conservatively.
    c. Funders should be communicating with Roundtable members and vice versa.

2. Each private funding organization was created to respond to unique circumstances.

RECOMMENDATIONS FOR FURTHER DISCUSSION/ACTION:

This is a community the Roundtable should communicate with!

THE GREAT LAKES PROTECTION FUND

In 1989, after two decades of cooperation between the United States and Canada, the Great Lakes Protection Fund was established. With the objective of preventing further pollution and cleaning the Lakes, the governors of the Great Lakes states developed a structure for the fund. This action was the result of the 1972 Great Lakes Water Quality Agreement which includes an oil drill ban, toxic pollutant control and regulation on water diversions from the Great Lakes. $100 million has been pledged by the Great Lakes states to create the permanent endowment.

The Great Lakes Protection Fund supports projects that identify, demonstrate, and promote regional action to enhance the health of the Great Lakes ecosystem.

The Fund has four primary goals:

1. Prevent toxic pollution
2. Identify effective clean-up approaches in Areas of Concern designated by the International Joint Commission.
3. Demonstrate natural resource stewardship.
4. Clarify effect of toxic pollution on humans and wildlife.

The Fund encourages a range of strategies to meet these goals, including demonstration projects, research, data management, policy analysis and evaluation, regional coordination, roundtable discussions, education for action, promotion of public dialogue through the media, conflict resolution, and program planning and development.

Prevent Toxic Pollution

An ethic of pollution prevention, as opposed to pollution treatment, must be created in communities, government, business, and academia. Elimination of the use and discharge of toxic substances is essential to the long-term health of the lakes ecosystem, yet knowledge and discussion of pollution prevention strategies remain limited. Interchange and cross-fertilization among citizen groups, industry, and academic experts can expand this knowledge base, as can collaboration across political boundaries. The Fund supports efforts that:

A. Reduce or eliminate toxic emissions by businesses, households, and farms through education programs, collaboration, negotiation, or community action.

B. Promote technology transfer including chemical substitution, product reformulation, production process changes, equipment change, and maintenance and housekeeping modifications.

C. Encourage consistent basin-wide toxic use reduction policies among businesses, government, environmentalists, academics, and citizens.

A New Approach

A partnership among all the stakeholders

- industry
- academia
- government

Committed to the development and acceptance of innovative waste reduction technologies and practices through an effective alignment of:

- engineering research
- engineering education
- industrial practice

Sponsors

Airco Industrial Gases
Arthur D. Little
Battelle-Pacific NW Labs
Bechtel
BP America
B&V Waste Science Technology
Chemical Waste Management
Dames & Moore
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3M
Mobil R&D
Monsanto
CW Nofsinger
PPG Industries
Union Carbide
United Engineers & Constructors
Westinghouse Electric
Woodward-Clyde

Mission and Goals

Partnership

- Industry
- Government
- Universities

Programs

- Targeted R&D
- Technology & Information Dissemination
- Education

Goals

- Clean, Economically Competitive Processing & Manufacturing Facilities

For More Information about CWRT....

Contact

Dr. Larry Ross, Executive Director
Center for Waste Reduction Technologies
345 East 47th St.
New York, NY 10017
(212)-705-7407 voice
(212)-752-3294 fax

SESSION SUMMARY

SESSION NAME: International Opportunities in Pollution Prevention

FACILITATOR(S) NAME: Larry C. Lai

DAY AND TIME OF SESSION: Thursday, April 29, 1993, 10:30 a.m.

APPROXIMATE NUMBER OF PARTICIPANTS: 55

OBJECTIVE OF SESSION:

1. Familiarize Roundtable members with the challenges and opportunities that exist in performing international pollution prevention work with the World Environment Center (WEC), and the U.S. Agency for International Development (USAID).

2. Give concrete examples of how members can "make a difference" by working in developing countries.

3. Provide familiarity with USAID activities in Asia and the new Environmental Pollution Prevention Project (EP3) being launched by USAID.

KEY POINTS MADE BY SPEAKERS AND PARTICIPANTS:

Burt Hamner, Washington Department of Ecology:

Burt Hamner made a presentation about his two recent trips to the Philippines. The first trip included discussions with industry and government officials, a one day workshop, and inspections of retail facilities in Manila. During the second trip, Hamner presented an economics-based participatory training course on pollution prevention. This course explained both the costs and risks associated with waste generation. Observations from his experiences were as follows:

- The Philippines face fundamental environmental problems, such as the need for sewage treatment.
- There is a need for basic management tools. Data management is mainly manual, computers are scarce.
- Many times employees are not thought of as a resource to be developed, but rather as a resource to be used. Labor is plentiful.
- There is a huge need for basic technical information transfer.
- An underground economy exists that is not affected by environmental regulations.
- Worker conditions in factories are very poor.
- The importance of a local contact to help arrange meetings and make other logistical arrangements can be the difference between success and failure.
- Be aware and be adaptable!

Hamner's main concern seemed to be justifying expenditure of his time to State management. However, he said that these projects were the most rewarding environmental projects that he had ever undertaken, and he felt that he had made a difference.

The first of Hamner's trips was as a WEC volunteer, with only travel and per diem costs being paid. For the second trip, Hamner was a paid consultant to USAID.

Rom Michalek, WEC:

Rom Michalek provided a brief overview of WEC programs. Two of WEC's programs are the International Environmental Forum, made up of about 60 multinational companies, which meets quarterly with ministers of the environment from countries around the world; and the International Environmental Development Service program, which provides senior environmental advisors on a pro bono basis to developing countries.

Michalek discussed WEC's waste minimization efforts in Eastern Europe. He indicated that there was a history of centralized government systems and subsidies, and that little emphasis was placed on pollution control. Today, economic considerations are paramount and there is no enforcement of environmental regulations.

WEC's Eastern European demonstration program is working in 10 countries in Eastern Europe and developing 6 month waste minimization projects to be carried out by the local enterprises. These projects generally include: obtaining the commitment of the facility management, conducting a waste minimization opportunity assessment, in-plant training, and the conduct of pollution prevention projects by plant engineers. Since these are demonstration projects, the outcome of the projects is widely publicized. These demonstration projects have been highly successful and have resulted in major cost savings for the facilities involved.

Michalek indicated that WEC is always looking for qualified volunteers and encouraged interested individuals to complete WEC's volunteer profile form.

Jeff Eppink, USAID - Asia Bureau:

Jeff Eppink provided an overview of the environmental challenges that exist in Asia, including an ongoing population boom and high rates of urbanization, accompanied by high rates of economic growth. He indicated that it is USAID's strategy to integrate environmental and industrial development.

Three countries highlighted in Eppink's presentation:

1. **Indonesia:** Surface water pollution is the country's greatest environmental priority. There is also increasing demand for water from the growing industrial community and concern about the management of hazardous wastes that result from industrial activity.

2. **Philippines:** The country is faced with huge solid waste management problems. He estimated that less than one-half of solid wastes are being properly disposed. Another issue is lack of wastewater treatment facilities. Finally, there is concern over the environmental damage resulting from mining wastes.

3. **Thailand:** The main problem is water pollution; the Gulf of Thailand is very polluted. Industry is concentrated in the Bangkok area, and while the government has been able to identify the generators of hazardous wastes, problems exist with hazardous waste management.

In terms of pollution prevention regulation, Eppink indicated that Singapore has a sophisticated regulatory system, Malaysia and the Philippines are fairly advanced. Thailand is perhaps the least sophisticated of the four countries, although the government has recently embarked on a new enforcement initiative.

USAID has a number of ongoing projects in Asia and needs to form partnerships, possibly between states and Asian countries. USAID is also looking for U.S. organizations to serve as hosts for Asian delegations.

Finally, Eppink mentioned USAID's grant-making program with National Association of STATE Development Agencies under the U.S.-Asia Environmental Partnership, and the fact that grants are available for promoting U.S. technology in Asia.

Deborah Hanlon, U.S. Environmental Protection Agency:

Hanlon is on loan to USAID to assist in the implementation of AID's Environmental Pollution Prevention Project (EP3). This is a 7 year $20 million initiative that will address source reduction, waste treatment, and disposal in industrially developing countries. Offices will be established in target countries and focus on: industrial technical assistance, training and information transfer, technology (clean production) diffusion, and environmental and policy development.

Hanlon foresaw the need for pro bono technical assistance to provide specialized technical assistance, and work with country offices. She also requested that pollution prevention case studies be shared with the Pollution Prevention Information Clearinghouse.

RECOMMENDATIONS FOR FURTHER DISCUSSION/ACTION:

Action items recommended for Board review are:

- Package membership P2 skills to market as a package to EPA, AID, and others. There may be a need to justify volunteering through the sale of state goods.
- Assist in the development and dissemination of information on volunteer opportunities to states, municipalities, and industries.
- Consider the use of volunteers as part of state contributions required for matching grant funds.
- Reach out to local organizations, assisting their participation through scholarships.

SESSION SUMMARY

SESSION NAME: Regional and State Roundtable Initiatives

FACILITATOR(S) NAME: Terri Goldberg
Claire Rowlett

DAY AND TIME OF SESSION: Thursday afternoon

APPROXIMATE NUMBER OF PARTICIPANTS: 30

OBJECTIVE OF SESSION:

The objective was to share information on Regional P2 Roundtable activities and to identify how to structure relationship of Regional and State Roundtables and the National Roundtable.

KEY POINTS MADE BY SPEAKERS AND PARTICIPANTS:

1. State/Regional Roundtables have been formed in almost all regions of the County. The EPA regions are providing staff or grant support to these Roundtables.

2. The Regional Roundtables meet, or are starting to meet, semi-annually or quarterly to share information on State P2 activities and address issues of common concern.

3. Several Regional Roundtables have also initiated training and P2 clearinghouse activities as groups.

4. Involving media programs and sustaining the Roundtables are major challenges facing the groups.

5. The National Roundtable needs to establish linkages with the Regional Roundtables so that our efforts are complimentary.

RECOMMENDATIONS FOR FURTHER DISCUSSION/ACTION:

Jim Lounsbury should try to meet with Regional Roundtables to get their comments on the relationship of Regional and National P2 Roundtable efforts.

FOLLOW-THROUGH, INCLUDING CONTACT NAMES AND PHONE NUMBERS FROM PARTICIPANTS WHO COMMIT TO WORKING ON THIS ISSUE, AND ANY MILESTONES WITH APPROXIMATE TIMELINES:

Terri Goldberg - (617) 367-8558
Claire Rowlett, EPA, Reg. 10
Carol Mannell, EPA, Reg. 4
Bill Wilson, EPA, Reg. 9
David Lievle, University of Wisconsin

NORTHEAST WASTE MANAGEMENT OFFICIALS' ASSOCIATION (NEWMOA)

- Non-Profit Interstate Gov. Org.
- New England States, NY & NJ
- Solid & Haz. Waste & P2 Programs
- Technical Assistance
- Policy Discussion Forum
- Training
- Research
- Funded by EPA & States

CLEARINGHOUSE

- 1,300 Books, Articles, Reports, Fact Sheets, Case Studies & Others

- PIES Mini-Exchange:
  -- Experts List
  -- Publications List
  -- State Updates

- Clearinghouse Network Committee:
  -- Regional Database of P2 Publications
  -- Regional Vendor List
  -- Regional Case Study Compendium

- Directory of State/Local P2 Contacts

- Packets of P2 Information on Target Industries

RECENT INITIATIVES

- Network of Univ. Based Programs
- P2 Financing Handbook
- Industry Workshops on P2 Financial Analysis
- P2 Clearinghouse Node
- Advanced P2 Instructor Training Workshop

CHALLENGES

- Staff Support -- Funding
- Inter-State Coordination
- Developing Database Expertise
- PIES Mini-Exchange Coordination
- Conversion of NE P2 Clearinghouse to INMAGIC Database
- Tracking Requests for Information
- Evaluation of Services
- Keeping Up With Rapid Changes

SESSION SUMMARY

SESSION NAME: Retired Engineers

FACILITATOR(S) NAME: Vic Young
Donna Toy-Chen

DAY AND TIME OF SESSION: Thursday, April 29, 1993, 4:00 - 5:30

APPROXIMATE NUMBER OF PARTICIPANTS: 30 lively, interactive persons

OBJECTIVE OF SESSION:

The objective was to discuss the pros and cons of the various retired engineers' programs. These include Region IV, Iowa, Texas, New Hampshire, California, and New Jersey.

KEY POINTS MADE BY SPEAKERS AND PARTICIPANTS:

Of particular interest to the majority was the incorporation of the Alabama program into a 501c corporation (non-profit), the Alabama Waste Reduction and Technology Transfer Foundation. Since this allows for industry to donate funds, as well as having an entity to apply for grants, etc., this appears to be a way to provide the program with long-range funds. (Contact: Doug Myers - (205) 386-2807)

Other discussions covered the database of Region IV Retired Engineers and showed their expertise. This compared to other programs that specialized in technical areas and some programs that were training their engineers to cover many different areas of technology. The versatility of the program managers seemed to be the only limit to these programs.

The programs, typically, ranged in success from great to fantastic. However, some initial concerns related to the retired engineers' programs were:

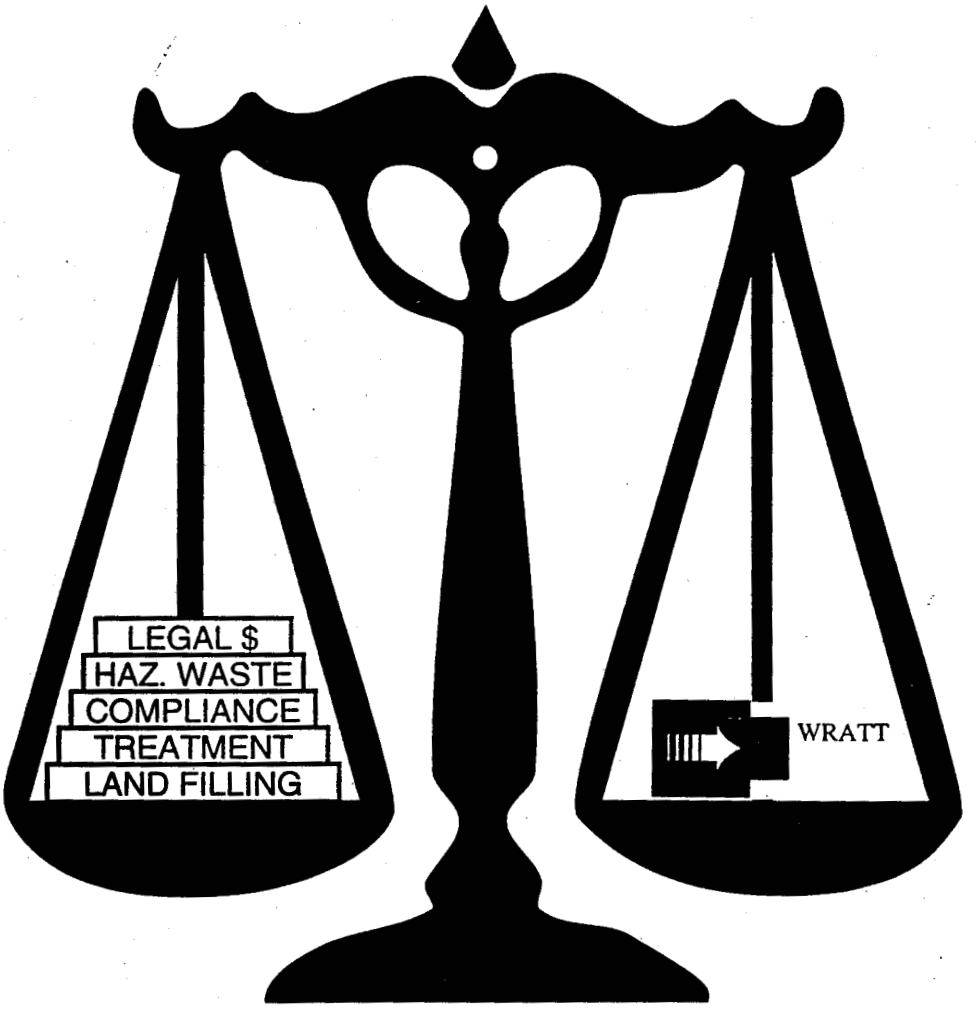
- on-site training,
- getting engineers "on-board" (how to),
- safety training and equipment,
- insurance,
- management,
- report writing and proofing,
- liabilities on-site,
- updating technical training.

RECOMMENDATIONS FOR FURTHER DISCUSSION/ACTION:

Audience participation was excellent. This may be a workshop that could be run annually to develop a listing of success stories as more states get involved with this block of talent.

Alabama Waste Reduction and Technology Transfer Foundation

WRATT



An Ounce Of Prevention Is Worth A Pound of Cure

WHO ARE WE?

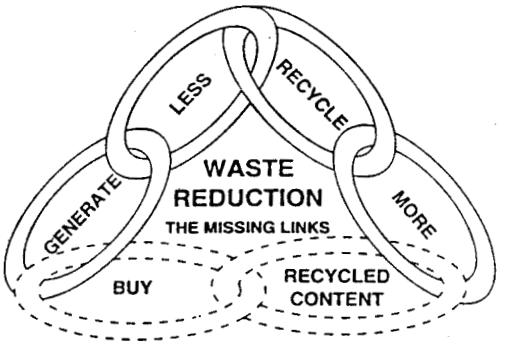
We are the Alabama Waste Reduction and Technology Transfer Foundation (WRATT). The program was initiated in 1989 as a public/private partnership between the Tennessee Valley Authority (TVA), the Alabama Department of Environmental Management (ADEM), and a 501(c)3, not-for-profit corporation. It is currently structured as a foundation, co-sponsored by TVA, ADEM, the Business Council of Alabama (BCA) and the Alabama Chemical Association. The program is staffed by a dedicated group of retired engineers and scientists who have extensive industrial experience in the areas of waste reduction and pollution control. Many of these individuals were executives with major corporations and they are offering to share their knowledge and experience in order to help your company assess its waste disposal practices.

WHAT DO WE DO?

The sole purpose of the WRATT foundation is to provide free, confidential, non-regulatory, non-compliance waste reduction assessments for industries in Alabama who request our services. Every aspect of your operation is methodically reviewed to uncover potential waste reduction strategies and opportunities, including; source reduction, reuse, recycling, energy recovery and treatment, such as shown on the following pages. You will receive a written report identifying and evaluating various waste reduction opportunities and containing specific recommendations which could help you save money, increase efficiency, reduce the need for costly new disposal facilities, reduce your liability, and promote a good public image. Some of the recommendations may cost money, however, you are under no obligation to implement any of the recommendations, the decision to spend money is entirely yours.

HOW DO YOU CONTACT US?

The headquarters staff of the WRATT Foundation consists of an administrative project officer, a technical project officer, and a technical writer, all retirees, who are housed at the TVA complex in Muscle Shoals, Alabama. Additionally, 50 retired engineers and scientists are located throughout the state. If you would like to obtain more information on the program, or request a visit by a WRATT representative, just call (205) 385-2807 or FAX (205) 386-2150.



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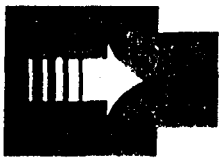

WRATT
ALABAMA
WASTE REDUCTION AND
TECHNOLOGY TRANSFER PROGRAM

REASONS THE ALABAMA WRATT PROGRAM HAS BEEN WELL ACCEPTED BY INDUSTRY

I. The concept of utilizing retired engineers and scientists is vital to gaining entrance into plants.

a)Review of plant operations
b)No personal gain - no equipment to sell
c)Mature individuals-plant experience-high level of expertise with experience usually of the type of plant visited.

FREE

II. It is free. - No cost to company. First come first served.

CONFIDENTIAL

III. Reports to plant management are confidential. Also retirees are required to hold information obtained about plant processes in confidence.

NON-COMPLIANCE
NON-REGULATORY

IV. Recommendations are based on good engineering design and practice. Not compliance oriented. In most cases management enacts team recommendations. Most recommendations are based on retirees own plant experiences. Professional "stand alone" type reports prepared.

VOLUNTARY

V. No pressure to enact recommendations from plant assessment - Encourage employee participation in setting up in-house waste reduction teams; also encourage company management to develop a written policy statement regarding waste reduction and pollution prevention.

VI. Resource Center -

a)Recommendations based on past success stories-concepts that are accepted/proven.
b)Library of information for particular processes of operation, and for specific industries.
c)Opportunities for R&D.

VII. Separation of regulators from program, but with access to technology available from regulators.

VIII. Assessments are requested - WRATT Service by invitation only. Plant needs help from an unbiased source and wants a peer review to improve overall operational efficiency.

IX. Business community and regulators willing to work together to help Alabama industry reduce the cost and liability of waste.

X. Golden Rule concept - retiree attitudes are to help not hurt plant management.

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SESSION SUMMARY

SESSION NAME: Targeting RCRA Waste for Waste Minimization

FACILITATOR(S) NAME: Donna Perla, U.S. EPA
Dan Garza, CA DHS, Department of Toxic Substance Control
Pat Macht, CA Waste Management Board

DAY AND TIME OF SESSION: 8:30 - 10:15, Friday, 4/30/93

APPROXIMATE NUMBER OF PARTICIPANTS: 66

OBJECTIVE OF SESSION:

Present the efforts of California's Department of Toxic Substances Control on targeting incinerable wastes in order to approach operators and initiate a voluntary source reduction program.

Present the efforts of California's Waste Management Board's out-reach efforts to consumers to both source reduce through consumer habits and recycle after consuming.

KEY POINTS MADE BY SPEAKERS AND PARTICIPANTS:

- California used capacity assurance plans and manifests to identify which wastes and generators to target. A shortfall in incinerator capacity led California to focus on those wastes being generated that were being exported to other State's incinerators (since California has no incineration capacity). A 68% reduction in manufacturers' and recyclers' waste was seen from 1987 to 1991 after challenging those generators to voluntarily reduce their wastes. Reductions of specific wastes were not analyzed and adjustments for economic activity were not made, however, California thought it might be useful to further analyze the data in this way.

- California Waste Management Board presented their public outreach campaign for source reduction and recycling by consumers. The target audience for the campaign was women from 26-45, who are, for the most part, key consumers of households. General radio advertisements, two TV commercials advertising the concept and an 800 number to call for more information were shown. The audience was both entertained and interested in the outreach products.

NO FURTHER RECOMMENDATIONS

SESSION SUMMARY

SESSION NAME: Organizing Roundtable Outreach and Position Efforts

FACILITATOR(S) NAME: Kevin Dick, Manager
Business Environmental Program
Nevada Small Business Development Center

DAY AND TIME OF SESSION: Friday, April 30, 1993, 8:30 - 10:00

APPROXIMATE NUMBER OF PARTICIPANTS: 35

OBJECTIVE OF SESSION:

Identify issues for the Roundtable to be involved with. Organize to develop positions on these issues, to provide better outreach for the Roundtable and to expand membership.

KEY POINTS MADE BY SPEAKERS AND PARTICIPANTS:

Throughout the conference, reference was made about things that the Roundtable could do regarding various issues or projects. Since the Roundtable is a member-supported organization, the Roundtable is not going to do anything unless the membership contributes effort toward making these things happen. Discussion focused on identifying issues that membership was interested in working on, and on a process to develop working groups in order to address these issues. An initial list of 22 topic areas was developed. From this list, eight areas were developed for organizing activities. It was felt that these eight areas captured most of the 22 topics, and that by organizing around these eight areas, each topic might be addressed through sub-committee type activities.

The short list of eight issue areas and the original list of twenty-two areas follow. In order to move forward, individuals were identified who were interested in taking a lead in these areas. No one volunteered in the area of funding. Anyone interested in taking the lead in organizing a group to address funding issues should contact Kevin Dick or Tom Blewett.

To follow-up on these activities, a letter will be mailed to each of the lead people for the work areas, requesting that they write several paragraphs to describe the work that will be undertaken within their area. These descriptions and contact information for work group leaders will be distributed to the Roundtable membership in order to solicit membership participation. This mailing will also solicit members who are interested in representing the Roundtable in outreach and speaking activities, with the goal of developing a speakers bureau of interested members and topics they are available to present.

Session Name - Organizing Roundtable Outreach and Position Efforts

It was suggested that the Roundtable conferences focus on these work group areas in the future. George Smelcer, TN, who is organizing the next conference, requested that people who had suggestions for topic areas contact him ASAP.

Roundtable issues:

1. Local Governments - Dan Moe, Tom Hersey, Jon Jennings, Rick Yoder
2. Legislative/Regulatory Review - Lee Dillard, Stan Springer, David Williams
3. Information and Technology Transfer - Dave Thomas, Tom Blewett
4. Funding - Linda Pratt
5. Education and Training - Pat Gallagher, Karen Sanchez, Stephanie Bernkopf
6. Research - Cindy McComas, George Smelcer, Mark Rosi
7. Planning and Measurement - Kevin McDonald, Tom Blewett, Cindy McComas
8. Membership/Outreach - Kevin Dick, Pat Gallagher, Tom Hersey

Additional membership involvement will be solicited.

RECOMMENDATIONS FOR FURTHER DISCUSSION/ACTION:

I. Local government outreach funding
   - A. funding
   - B. management backing
   - C. household hazardous materials & CESQG's programs

II. Source reduction review

III. Regulatory development and review
   - A. Federal
   - B. state

IV. Industry involvement

V. Follow-through on existing activities
   - A. training
   - B. measurement
   - C. data gathering
   - D. State programs

VI. Research and information needs
   - A. completed projects
   - B. new initiatives

VII. Working sessions on emerging issues

Session Name - Organizing Roundtable Outreach and Position Efforts

VIII. Focus activity of the Roundtable
  A. help from EPA for the agenda
IX. Base funding
X. Assist non-governmental entities (NGO's)
  A. governments promote participation
  B. support to NGO's/network
  C. cooperative projects
XI. Membership
  A. Roundtable members promote membership
  B. encourage membership from U.S. neighbor nations
XII. Membership
XIII. Facility planning
XIV. Pollution prevention education
XV. Better links with other organizations
  A. National
  B. local
XVI. Information exchange
XVII. Facilitate state multimedia meetings
XVIII. Examine and use models of other organizations on affecting legislation
XIX. Facilitate lists of state contacts for Federal agencies
XX. Expand the number and type of sectors receiving P2 help
XXI. Legislation re-authorization (right-to-know, and others
XXII. Use/facilitate regional Roundtables

SESSION SUMMARY

SESSION NAME: University Education Programs in P2

FACILITATOR(S) NAME: Nandkumar Bakshani

DAY AND TIME OF SESSION: Friday, April 30, 8:30 - 10:00 a.m.

APPROXIMATE NUMBER OF PARTICIPANTS: 37

OBJECTIVE OF SESSION:

The objective is to present an overview of university action in (i) incorporating P2 programs into their curricula, and (ii) developing and disseminating pertinent new P2 educational material.

Universities are educating future generations of P2 scientists, engineers, business and law professionals and other decision makers. Are the universities meeting the challenge and making headway in the curriculum development to provide them with the necessary training in P2?

KEY POINTS MADE BY SPEAKERS AND PARTICIPANTS:

I. "P2 in Education at U.S. Universities", N. Bakshani, Department of Chemical Engineering UCLA telephone number (310) 825-6303 - key points:

   A. Development of a directory of university educators active in P2 curriculum development (the Directory was published through the National Pollution Prevention Center, see presentation 2). *Survey Methods:* educators interested in P2 identified through conference attendance lists, previous surveys and referrals. Telephone interviews of approximately 100 educators active in P2.

   B. P2 education is concentrated in engineering and science departments (66% of respondents) and is gradually penetrating the social science and liberal arts departments (14% of respondents), though it is viewed primarily as a technological issue.

   C. P2 tends to be taught as a specialized senior elective or a graduate course rather than as a fundamental element of the curriculum.

   D. Lack of consensus on the definition of P2 hinders the transfer of curricula among universities.

E. P2 does not fit neatly into any single discipline. Interdisciplinary approaches to P2 are necessary.

II. "Curriculum Development - A National Effort", Doug Moody, National Pollution Prevention Center - University of Michigan, telephone number (313) 764-1412, key points:

A. The mission of the National Center for Pollution Prevention is:

1. Collect and organize all existing educational materials at universities in the U.S.
2. Work to develop materials to fill in the "gaps" and avoid duplicating efforts.
3. Build a national network of P2 educators to facilitate the exchange of educational materials.
4. Encourage the participation of all sectors of society (industry, government, NGO's and academe).

III. "P2 at the University of Wisconsin - extension", David Liebl, University Extension, University of Wisconsin, telephone number (608) 265-2360. The University of Wisconsin:

A. has a strong commitment to Continuing Education focused on P2
B. has developed programs for professional engineers
C. offers in-plant training for Environmental Awareness and Design for the Environments
D. offers an outreach to industry through the Wisconsin Extension Service
E. provides satellite tele-conferences and statewide telephone conferences
F. provides in-facility P2 assessments by specialists
G. provides county-based Information Delivery and Education

IV. "New Connections between Faculty and State Programs", Terry Foecke, President, Waste Reduction Institute for Training and Applications Research, Minnesota, telephone number (612) 379-5995, key points are:

A. need for cooperation and sharing of resources between state programs and university faculty
B. in most instances, the state agency can facilitate the transfer or exchange of P2 materials by being a:

1. *partner* to highly interested faculty in the transfer
2. *process helper* by bringing faculty up to speed with the various P2 programs
3. *energizer* to less interested faculty by exposing them to available P2 programs and point out the benefits
4. *conduit* for transfer of materials

Session Name - University Education Programs in P2

RECOMMENDATIONS FOR FURTHER DISCUSSION/ACTION:

- Consider organizing a national effort to identify and list the P2 courses available in all disciplines,

  contact name and telephone: Doug Moody, (313) 764-1412

- Encourage state/local agencies to work with Universities to develop a P2 internship program,

  contact name and telephone: Terry Foecke, (612) 379-5995

- Improve access to P2 curriculum for specific disciplines,

  contact name and telephone: Doug Moody, David Liebl, (608) 265-2360 (may have some ideas)

- Much of P2 activity is policy-driven - how are educators involved in developing policy?

  contact name and telephone: N. Bakshani, (370) 825-6303

- Workshop - Have a working session between state agencies and faculty - exchange success stories, as well as failures.

  contact name and telephone: Terry Foecke, (612) 379-5995

FOLLOW-THROUGH, INCLUDING CONTACT NAMES AND PHONE NUMBERS FROM PARTICIPANTS WHO COMMIT TO WORKING ON THIS ISSUE, AND ANY MILESTONES WITH APPROXIMATE TIMELINES:

- Interdisciplinary activity - invite social scientists and liberal arts professionals to Roundtable Conferences and get their input on P2 education, problems, pitfalls, etc. Possibly look in the direction of non-technical solution to P2 problems.

  contact name and telephone: N.Bakshani, (310) 825-6303

- Identify foundations and funding agencies for P2 activity in Universities.

  contact name and telephone: Linda Pratt, (619) 338-2215

Pollution Prevention Education at Universities in the United States

Nandkumar Bakshani and David T. Allen

As the emphasis of environmental protection shifts away from end-of-pipe controls, universities could have a leading role in fostering pollution prevention through education. Thus far, however, it appears that pollution prevention has not been enthusiastically embraced as an academic discipline. To test this perception, the Department of Chemical Engineering at UCLA recently conducted a survey of the status of university-based pollution prevention education in the United States.

INDUSTRY, GOVERNMENT, AND regulatory agencies are increasingly employing pollution prevention methods to meet environmental objectives. As prevention replaces end-of-pipe controls as the dominant strategy for preserving environmental quality, the educational background required of environmental professionals and decision makers whose actions affect the environment will also change. Environmental engineers will be called on to know more about process and product design, and their expertise will be less focused on control technologies. Industrial managers will need to understand and quantify full life-cycle costs. Consumers will make purchasing decisions based on their perceptions of the environmental effects of products.

Universities, as institutions charged with educating the next generation of environmental engineers, industrial managers, and consumers, could play a leading role in fostering pollution prevention. However, the general perception, with few exceptions, is that pollution prevention has not been enthusiastically embraced by academia. To test the validity of this perception, the Department of Chemical Engineering at the University of California, Los Angeles (UCLA) conducted a survey of university-level pollution prevention education in the United States. The survey did not address pollution prevention research, which has been summarized elsewhere.[1]

Survey Methodology

More than 140 individuals from 80 universities and colleges were contacted during the survey period (December 1991 to February 1992). From this group, approximately 80 individuals from over 50 institutions provided information about their pollution prevention education efforts.[2]

The individuals were identified through the pollution prevention directory developed by the Washington State Department of Ecology,[3] publications, reports, and other sources. The individuals surveyed were asked to address three broad issues:

1. Scope and emphasis of their pollution prevention program
2. Type, level, and frequency of courses, enrollment figures,

Nandkumar Bakshani *is a research fellow and* ***David T. Allen*** *is an associate professor and chairman of the Department of Chemical Engineering in the School of Engineering and Applied Sciences at the University of California, Los Angeles (UCLA).*

and teaching aids
3. Complementary research and funding sources

The survey focused on *individuals*, because new directions in curriculum development are most often initiated by individuals acting in isolation or in small groups at their home institutions. In the rare instances in which cooperative efforts to promote pollution prevention and environmental education at universities have occurred, these activities were usually associated with pollution prevention research centers.

Although a single, comprehensive definition of pollution prevention is likely to remain elusive, a more universally accepted definition would enhance development of course materials.

The home departments for individuals or small groups working in pollution prevention include agricultural engineering; anthropology; business and management; chemical engineering; civil engineering; computer science; ecology; environmental science/engineering; public health; university extension programs; and urban planning. (See **Table 1**.) Some nonuniversity personnel active in pollution prevention, and operating through community colleges, were also contacted.

The Results

Out of a total of 80 respondents, the majority came from science and engineering departments; the rest were from social science and liberal arts, business and management schools, and other departments. This is a reflection of the many technical dimensions of pollution prevention that do not easily cross over into non-science/engineering curricula. **Figure 1** shows the percent distribution of respondents to the survey by department. The survey results are summarized below.

Pollution prevention lacks a common definition

The term "pollution prevention" has no broadly accepted definition. The spectrum of activities that are called pollution prevention range from toxics use reduction to disposal of wastes. The lack of a common terminology suggests that there is no agreement on the elements and intellectual content of pollution prevention education and research. This situation has severely limited the transferability of curricular materials among universities. Course materials on pollution prevention that address the entire waste management hierarchy are vastly different from pollution prevention materials that emphasize source reduction. Although a single, comprehensive definition of pollution prevention is likely to remain elusive, a more universally accepted definition would enhance development of course materials.

Science and engineering

The primary focus of environmental engineering education continues to be on control technologies, rather than pollution prevention. When pollution prevention is taught it is usually treated as a specialized topic in a separate course. For example, the University of Alaska (in conjunction with the Alaska Health project in Anchorage) offers a graduate-level course that provides an overview of industrial waste reduction concepts and application in the U.S., particularly Alaska. The Illinois Institute of Technology has developed a course called "Planning and Implementation of Industrial Pollution Prevention Programs."[4] The course will be broadcast on a local interactive television network. UCLA offers an un-

dergraduate course, "Pollution Prevention in Chemical Processes," that teaches design methods for minimizing wastes and tools to identify substitutes for hazardous materials.[5] Several other environmental and chemical engineering programs (e.g., New Jersey Institute of Technology,[6] North Carolina State,[7] Tennessee,[8] Louisville[9]) have also added pollution prevention classes.

When departments offer elective instruction in pollution prevention, the audience is generally undergraduate seniors, graduate students, and professionals. Therefore, the students' first exposure to pollution prevention concepts comes after they have completed the core engineering and science curriculum and developed a knowledge of design tools. Teaching pollution prevention without including these concepts in core courses suggests that it is almost an afterthought.

Course modules, homework problems, and design problems that illustrate both pollution prevention and fundamental engineering principles are still relatively rare.

Course modules, homework problems, and design problems that illustrate both pollution prevention and fundamental engineering principles are still relatively rare. This approach, however, is one way to incorporate pollution prevention into the core engineering curriculum. For example, a course in mass and energy balances, typically offered in chemical engineering curricula, could include homework problems based on waste and energy inventories used in life-cycle analysis. Likewise, courses in engineering economics could discuss the impact of environmental liability costs. Recently, the American Institute for Pollution Prevention and the American Institute of Chemical Engineers have published a compendium of homework and design problems for engineering curricula.[10] These problems may serve as a model for other curriculum development efforts.

Social sciences and liberal arts

Pollution prevention education has recently entered the domain of the social sciences and liberal arts. For instance, the Anthropology and Archaeology Department at the University of Arizona offers a course that examines data from analyses of garbage and landfills (comparing the public's perception of the composition of a landfill versus actual garbage in landfills) and applies life-cycle analysis to commodities and products. At the University of Minnesota, the Housing, Design, and Apparel Department has introduced a course, "The Designed Environment," that teaches students to use life-cycle analyses to help them select the best reusable/recyclable materials to construct a theater set. The course also addresses pollution prevention issues in applied design arts and graphics design. Field trips to landfills, polluted areas, and recycling centers are part of the course.

Pennsylvania State University and UCLA both offer courses in geography that discuss human attitudes and behavior that are causing degradation of the environment. Courses also address public policy issues, such as zoning laws and their impact on commuter driving distances, taxes on pollution, and other positive incentives to prevent pollution. In the field of education, Clark Atlanta University in Atlanta, Georgia, runs an intensive one- to two-week teacher training program on environmental sciences and pollution prevention for grades kindergarten through twelve (K-12). The program emphasizes the need for more science education for K-12 students.

Table 1. Pollution Prevention

University	*Course Content*	*Department*
University of Arizona	Public behavioral mechanism and its impact on pollution prevention	Anthropology
University of Alaska	Pollution Prevention regulations, health & safety, and disposal/reuse	Civil Engineering
University of California		
Santa Barbara	Training employees to become environmental specialists	University Extension
Berkeley	Developing pollution prevention ordinances	University Extension
Riverside	Technological evaluation of industrial processes, pollution prevention recommendations	University Extension
Berkeley	Control of toxic contaminants	Civil Engineering
Los Angeles	Environmental literacy, Chemical process design for pollution prevention	Chemical Engineering
Los Angeles	Toxics reduction: science, engineering and policy	Chemical Engineering, Public Health and Urban Planning
Los Angeles	Relationship with the environment and the effect of climatic conditions	Geography
University of Connecticut	Fostering an environmental industry through entrepreneurial enterprises in pollution prevention technology	Pollution Prevention Center
University of Florida	Waste management and regulation of small businesses	Continuing Education
Clark Atlanta University	K-12 teacher training programs	Education
Iowa State University	Senior elective course in engineering design	Chemical Engineering
University of Idaho	Advanced plant design; hazardous chemical waste	Chemical Engineering
University of Illinois (Urbana-Champaign)	Laboratory waste management efforts, environmental health and safety	Environmental Health and Safety
Kansas State University	Pollution prevention in civil and chemical engineering seminars	Hazardous Substances Center
	Incentive-based pollution prevention programs for industry	Public Safety
	Process synthesis and pollution control	Chemical Engineering
University of Louisville	Risk reduction and industrial waste management	Chemical Engineering
Louisiana State University	Development of markets for waste	Waste Recycling Institute
University of Maine	Land application for waste materials	Agricultural Resources
	Training educators and students in management of chemicals	Environmental Research Center

Education at Universities

University	*Course Content*	*Department*
MIT	Understanding of and responsibility for the environment (all disciplines)	Technology, Policy, and Industrial Dev.
Tellus Institute	Industrial capital budgeting process to encourage pollution prevention	Risk Analysis
Michigan State University	Solid waste handling for small businesses and consumers (toll-free telephone line)	Resources Development
University of Michigan	Development of pollution prevention modules in physical sciences and engineering	National Pollution Prevention Center
Wayne State University	Waste minimization in the automobile industry	Chemical & Metallurgical Engineering
University of Minnesota	Dealing with livestock waste problems	Agriculture
	Incorporation of pollution prevention thinking in business management	Management
	Legislative aspects of pollution prevention and engineering design	Chemical Engineering
	Waste reduction and pollution prevention in the chemistry laboratory	Chemistry
	The designed environment—pollution prevention from a product use perspective	Design, Housing and Apparel
	Pollution prevention ethics—examining the consequence of our actions	Agriculture
University of Montana	New technology in air pollution prevention and control	Environmental Engineering
University of New Hampshire	Pollution prevention through study of acid rain precursors	Chemical Engineering
New Jersey Inst. of Technology	Pollution prevention in engineering plant design	Chemical Engineering
New Mexico State	Waste reduction in business and industry	Education and Research Consortium
Cornell University	Source reduction for municipal waste	Center for Env. Research
Manhattan College	NSF workshop for college faculty on pollution prevention	Chemical Engineering
Keuka College	Waste reduction in chemistry laboratories	Education and Research
North Carolina State	Controlling wastewater in the food industry	Food Science
Western Carolina University	Improving mountain living	Center for Mountain Living

(Continued on next page)

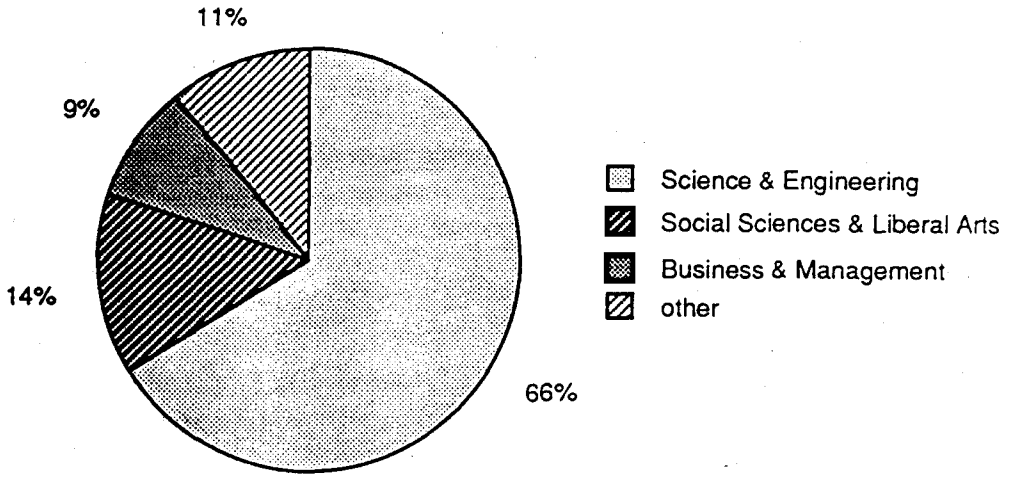
Table 1 (cont.)

University	*Course Content*	*Department*
University of Cincinnati	Waste minimization through process synthesis American Institute of pollution prevention	Chemical Engineering Civil Engineering
Youngstown State	Artificial intelligence and neural networks	Chemical Engineering
University of Oklahoma	Waste management in health-related industries	Public Health
Oregon State University	Waste reduction in the engineering curriculum Socioeconomic impact of household hazardous waste	Civil Engineering Public Health
Pennsylvania State University	Impact of human behavior and driving forces behind pollution escalation; environmental problems of Mexico Radioactive waste management	Geography Nuclear Engineering
Carnegie-Mellon	Pollution prevention in automotive design; modularizing components to facilitate disassembly for reuse	Computer Science
University of Tennessee	Introduction to pollution prevention; design and process analyses for area businesses	Chemical Engineering
Texas A&M	Waste reduction and substitution technology for small businesses	Technical Engineering
University of Houston	Pollution prevention in operation and maintenance	Business Administration
University of Utah	Waste prevention in the medical field	School of Medicine
University of Washington	Incentives for application of accounting, financing and marketing to pollution prevention decisions Waste reduction in process streams	Business Administration Civil Engineering
Washington State University	Pollution prevention in the chemistry laboratory	Chemistry
Seattle Community College	Business protocol in the implementation of pollution prevention	Hazardous Material Training
University of West Virginia	Property rights and recycling from a consumer's viewpoint	Agricultural Economics
University of Wisconsin	Cost/benefit analysis of pollution prevention Effect of commercial packaging on the environment Domestic opportunities in substitution and avoidance	University Extension Professional Development Civil Engineering

Business administration

Historically, most schools of business administration have not addressed environmental issues. According to the Management Institute for Environment and Business (MEB), a Washington, D.C.-based environmental management educa-

Distribution of Responses to Pollution Prevention Survey



tion organization that disseminates curriculum and training materials, in 1987 no business schools offered environmental courses.[11] In 1990, less than 1 percent of students receiving master's degrees in business administration had any portion of their curricula devoted to environmental issues.

During the past few years, however, the efforts of groups such as the MEB and the Corporate Conservation Council of the National Wildlife Federation have encouraged the treatment of environmental issues in business courses. In 1989, three business schools (Boston University, the University of Minnesota, and Loyola University in New Orleans) were funded by the National Wildlife Federation to develop curriculum material on environmental management.[12] These institutions tested a pilot course called "Management of Environmental Issues." Although the course outline was different at each university, the general focus was management's perspective on the impact of environmental issues on corporate policy.

Today, more than thirty schools have elective courses on environmental management, including such topics as waste treatment costs, minimizing remediation liability, marketing green products, or pollution prevention capital budgeting. Seventy schools integrate environmental management into their core curricula, and a small number of schools have developed joint degree programs (e.g., Rensselaer Polytechnic Institute and Yale University). This momentum is rapidly increasing the numbers of business schools that are opening their classrooms to environmental topics for the first time. As these programs mature, it is likely that a greater focus on pollution prevention will emerge.

Pollution prevention centers

A number of pollution prevention research centers have been established at universities. From the point of view of pollution prevention education, these centers offer the potential to promote the cross-disciplinary

approach and development of multifaceted teaching materials.

Tufts University is a model example of the potential for multidisciplinary pollution prevention education.[13] The Tufts Environmental Literacy Institute holds annual workshops and seminars to develop and augment the environmental knowledge and skills of university faculty. Faculty are selected from diverse disciplines—scientific, legal, social, economic, political, technological, and ethical and behavioral perspectives—to explore environmental issues. Faculty are encouraged to create environmental course modules for use in their courses, and in this way, students receive broad and continuous exposure to environmental issues throughout their academic experience.

. . . pollution prevention is a multidisciplinary issue that does not fit neatly into a single university department.

Other pollution prevention centers, such as those at New Mexico State University and UCLA, have established significant curriculum development efforts.[14] In addition, the U.S. Environmental Protection Agency (EPA) has established a center focusing on pollution prevention education at the University of Michigan.[15]

Barriers to Advancement of Pollution Prevention

There are a number of barriers to the further development of pollution prevention curricula. The most serious is resistance to adding teaching commitments when the academic "plate" in most departments is already full. Thus, the addition of new courses must often be at the expense of existing courses.

The dearth of course materials and tools in the area of pollution prevention also affects departmental commitment. For example, business and public administration schools focus on financial evaluations of conventional end-of-pipe investments because lack of knowledge and teaching aids makes it more difficult to illustrate environmental accounting practices and financial investment tools that target pollution prevention. A few schools are reportedly committed to developing tools to integrate the economics of pollution prevention into accounting, finance, and marketing. The Tellus Institute in Boston has a program in pollution prevention economics supported by EPA, state governments, and several companies to study how a firm's capital budgeting process and project finance practices may be changed to encourage pollution prevention over end-of-pipe controls. The methods developed will be available for educational purposes.[16]

Lack of funding for pollution prevention research also poses problems. Finally, pollution prevention is a multidisciplinary issue that does not fit neatly into a single university department.

Pollution Prevention Education Strategies

There is much that academia, government, and industry could do to move past these barriers to expand university-based pollution prevention education. To cite just a few examples, EPA could integrate its emphasis on pollution prevention into more of its programs in environmental education. Industry could require that entering employees receive pollution prevention training in the same way that they automatically receive safety training. Such requirements would dramatically increase the demand for pollution prevention training materials. Accrediting agen-

cies (which are populated by university faculty) could require pollution prevention in selected curricula. This would also increase demand for materials. With such proactive measures, the number and quality of university course offerings in pollution prevention could be dramatically increased. ◆

Notes

1. Freeman, H., T. Harten, J. Springer, P. Randall, M.A. Curran, and K. Stone, "Industrial Pollution Prevention: A Critical Review," *Journal of the Air and Waste Management Association* 42, 618-56 (1992); University of Massachusetts, Lowell, MA, Toxics Use Reduction Institute, "Toxics Use Reduction Research Directory," One University Avenue, Lowell, MA 01854 (1992); and New York State Center for Hazardous Waste Management, "Research and Development in Hazardous Waste Management," State University of New York, 207 Jarvis Hall, Buffalo, NY 14260 (1989).

2. Summaries of individual reports and a list of survey respondents will be available from the National Center for Pollution Prevention in January 1993.

3. Washington State Department of Ecology, "Incorporating Pollution Prevention Concepts in Higher Education Curricula," Publication 91-33 (1991).

4. Course offered by Professor Ken Noll, Pritker Department of Environmental Engineering, Illinois Institute of Technology, Chicago, IL 60616.

5. Course offered by Professor David Allen, Department of Chemical Engineering, UCLA, Los Angeles, CA 90024-1592.

6. Course offered by Professor Demetris Petrides, Department of Chemical Engineering, New Jersey Institute of Technology, Newark, NJ.

7. Course offered by Professor Michael Overcash, Department of Chemical Engineering, North Carolina State University, Raleigh, NC.

8. Course offered by Professor Peter Counce, Department of Chemical Engineering, University of Tennessee, 419 Dougherty Building, Knoxville, TN 37996.

9. Course offered by Professor Marvin Fleischman, Department of Chemical Engineering, University of Louisville, Louisville, KY 40292.

10. Allen, D.T., N. Bakshani, and K.S. Rosselot, "Pollution Prevention: Homework and Design Problems for Engineering Curricula," American Institute of Chemical Engineers, NY, 1992.

11. Management Institute for Environment and Business, 1220 Sixteenth Street, N.W., Washington, DC 20036.

12. National Wildlife Federation, Corporate Conservation Council; publications include: Buchholz, R.A., A.A. Marcus, and J.D. Post, *Managing Environmental Issues: A Casebook,* New York: Prentice-Hall, 1991.

13. Tufts Environmental Literacy Institute, Dean Anthony Cortese, Tufts University, Medford, MA 02155.

14. Waste Management Education and Research Consortium, Professor John Townsend, New Mexico State University, Las Cruces, NM 88003; Center for Clean Technology, Pollution Prevention Programs, Professor David Allen, 5531 Boelter Hall, UCLA, Los Angeles, CA 90024-1592.

15. National Pollution Prevention Center, Jonathan Bulkley, Director, 430 East University, School of Natural Resources, University of Michigan, Ann Arbor, MI 48109-1115.

16. The Tellus Institute, Allen White, Director, Risk Analysis Group, 89 Broad Street, Boston, MA 02110.

SESSION SUMMARY

SESSION NAME: (More) Government Partnerships

FACILITATOR(S) NAME: Jesse Baskir, EPA Region 9
Hilary Lauer, Region 9

DAY AND TIME OF SESSION: Friday, 8:30 - 10:00 a.m.

APPROXIMATE NUMBER OF PARTICIPANTS: 30

OBJECTIVE OF SESSION:

Presentation of unique, regional P2 projects that form partnerships with Federal, State and private companies/agencies in order to show what other regional activities there are.

KEY POINTS MADE BY SPEAKERS AND PARTICIPANTS:

Dan Reich - EPA Region 9 - discussed the "Government/Industry P2 Partnership", which is a unique partnership with EPA Region 9 and private industry in Los Angeles, in order to reduce the release of 33/50 and other toxics. Observations: P2 viewed by industry as not very important - "we want to run our business"; it's difficult to get a high percentage of people/companies to come to work-shops/meetings without directly asking them what will get them to come and sign-up for partnerships. Community advisory groups offer good insight to partnerships. Agencies must work well together.

Fred Leif - Partnerships between EPA Region 9 and PG&E (utility company) came together to figure out how these two organizations can work together to prevent pollution. It has been very successful. Focus is on energy efficiency in Federal buildings, environmental education, outreach to customers, and R & D. The message is that regulatory agencies should find new partnerships to promote P2 and explore and share information. This will bring companies beyond compliance.

David Sorokin - EPA HQ - 33/50 Program - Gave status update of 33/50 program at national level. Companies do want recognition for participating in this P2 program; State partnerships are key to it's success.

Odelia Funke - Chief of Information Access Branch EPA HQ - responsible for getting TRI data out to the public. Constituencies are finding clever ways to use that data - e.g., combining TRI data and census data. EPA has huge amount of data and they're trying to figure out the best way to get it out in usable format to the public. They're trying some unique partnerships to work with industry and non-profits (i.e. partnerships with information/computer type companies, not the polluting industry).

RECOMMENDATIONS FOR FURTHER DISCUSSION/ACTION:

Can Odelia's group put together summary of information available and get that out to the Roundtable? Another participant commended her for speaking towards a social issue (environmental equity); Roundtable should address some social issues in future meetings. Roundtable could recommend or work with Odelia's group to define informational needs and ways to deal with the huge amounts of data that they have.

APPENDIX

LIST OF ATTENDEES

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